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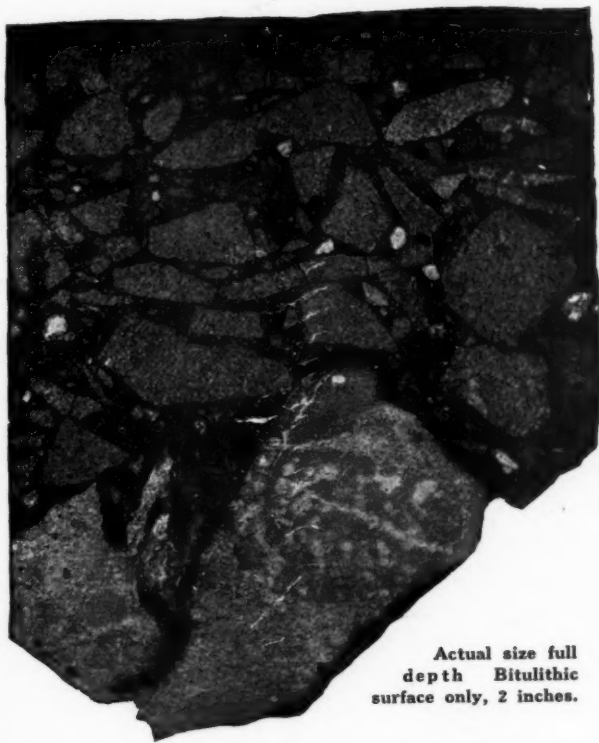
VOLUME XLIII
No. 8

August 23, 1917

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Municipal Journal

Volume XLIII

NEW YORK, AUGUST 23, 1917

No. 8

CONSTRUCTING THE STORM KING ROAD

Methods of Construction Where Roadway Has to be Blasted in Rock Cliff Four Hundred Feet Above Hudson River
—Compressed Air Used for Power Purposes—Handling Materials—Protecting Railroad Track and Trains from Falling Debris.

By A. C. PERKINS.*

For ten years New York State has been planning a road down the west side of the Hudson river, past Storm King and Crows' Nest Mountains. Two years ago, after a long delay in completing the plans, work was begun on this section. The contract, as let to the John L. Hayes Construction Company, of Yonkers, N. Y., calls for the construction of about 4¼ miles of road at a cost of approximately \$300,000. All of the work is in rugged and rocky country, but along Storm King and Crows' Nest it is necessary to construct the road along what is practically a vertical wall of solid rock, rising in some places to a height of a thousand feet above the river. So steep and inaccessible are the slopes along these places, that in making surveys for the road, cans of paint were fired from a small cannon against the face of the cliff to make marks at which the engineers could direct their instruments, as it was impossible to locate many places otherwise.

Designated as Route 3 of the New York State Highway Department, this road is one of the most important in the State, and with the completion of the Storm King section between Cornwall and West Point and the linking up of the road now being constructed by the Palisades Interstate Park from Fort Lee, N. J., opposite New York City, to Bear Mountain, just south of West Point, it will make a most popular through route to the north and west. Throughout the mountain section, the road will be near the river. Heretofore the mountain section has forced a long detour inland.

The road as now being constructed will be 24 feet wide from retaining wall to cliff and will be paved with a bituminous macadam pavement of standard construction 16 feet wide. Shoulders, each 4 feet wide, will be constructed along each side, and

on the outer edge will be a rubble retaining wall and a guard wall about 4 feet high. The maximum grade will be 7 per cent.

There are many interesting features in the work, the most difficult portions of which are along the sides of Crows' Nest, where the rock on which the road is being built overhangs the tracks of the West Shore railroad, and at Storm King, where much of the drilling for the initial blasting was done by men suspended from ropes fastened 300 feet overhead. At Crows' Nest, the greatest care is necessary to protect the railroad tracks below from rock sliding down the mountain side, and at both Crows' Nest and Storm King various devices have been tried out to protect the tracks. Logs are placed alongside the rails, barricades are built, when possible, below the line of the road, shooting is done only at specified hours, and every precaution is taken to keep rock from

endangering the railroad traffic. A crane is kept handy to remove any large debris from the tracks, and flagmen are stationed at all danger points.

Work is going on at four points. Rough grading is being carried on north of Storm King along a steep and rough hillside where the sidehill slope is nearly 45 degrees. Here a crane is employed, mostly for moving large rocks and for placing the wall stones where it is necessary to construct a wall. Work has been temporarily halted here. On the front of Crows' Nest some blasting work is going on. At the ravine between Storm King and Crows' Nest, a big culvert with an opening 10 x 15 feet and 154 feet long is being put in. Nearly 60 feet of fill must be placed over this culvert, requiring about 36,000 cu. yds. This culvert is practically the only place on the work where machinery can replace hand labor to any great extent. Considerable



PROFILE OF MOUNTAIN SIDE NEAR STA. 43,
JUST PREVIOUS TO STARTING DRILLING.

*Engineer in charge for the contractor.



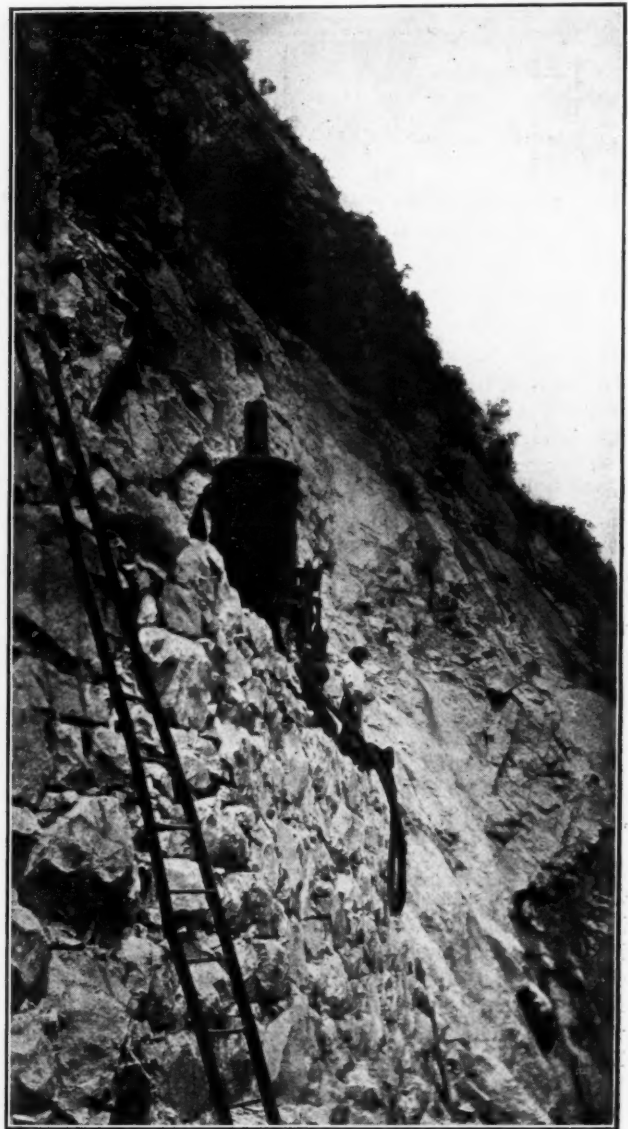
ROUGH WORK FOR THE ENGINEERS.

excavation is necessary in earth just south of the culverts, the earth being used for filling over the culvert. The work is being done by a Marion steam shovel, equipped with a $\frac{5}{8}$ -yd. dipper. The 2-yd. dump cars of 36-inch gauge are used to transport the earth from the cut to the fill over the culvert. This outfit, on a 200-yd. haul, handles about 300 to 400 cubic yards a day.

A great deal of work is being done along the face of Storm King, where a roadway is being blasted along the rocky face of the mountain. Here practically all of the material has to be moved by hand after blasting, owing to the fact that machinery cannot operate on account of the lack of space. For the first drilling, men had to be lowered over the cliffs by ropes. As soon as a shelf was established, work was carried on from this. When the shelf reached approximate grade, a retaining wall was constructed. In this work, it was necessary to complete the road in one operation as machinery can be moved forward no faster than a complete roadway is provided for it.

The usual procedure for this work is to drill a line of holes at the top of the cut slope with Jackhammer drills, the drillers and machines being supported by ropes hung from above. These holes are blasted, leaving a narrow bench on which it is much easier to work. Of course, much of the blasted material falls down the cliff—a distance of 400 ft. This operation is continued until a level is reached from 15 to 25 ft. above grade. The cut is then faced at right angles to the line of the road, the

outside hole being placed at about double the usual distance from the edge of the cut. This corner piece acts as a buffer, and allows a sufficient charge to be used to crack the stone while not throwing it down the mountain. The stone is then removed by the crane, the more regular pieces used to construct the wall and the remainder placed in embankment. Every effort is used to



RETAINING WALL AND CRANE FROM BELOW. DRILLS AT WORK IN DISTANCE ON CUT.

retain as much as possible of the blasted ledge, as the surplus is needed for filling at the ravine between Crows' Nest and Storm King. To carry this material, horse-drawn cars running on a construction railway will be used. The most troublesome transportation problem has been that of carrying the drill steel from the blacksmith shop to the drillers and back.

As stated before, it is necessary to construct the road practically at one operation, as for the most part it is half in excavation and half in embankment and no machinery can be moved forward in advance of the wall construction. The wall varies in height, according to the topography, in some places requiring a height of 50 ft. It is constructed of dry rubble except in the lower part, where it is laid up in mortar and has a batter of 1 inch to the foot on the outside and of 4 inches to the foot on the back. A guard parapet 4 ft. high, laid up in mortar, is built along the edge of the road. This

is topped with jagged pieces of rock set in mortar. Weep pipes are placed at intervals of 10 ft. in the retaining wall. In constructing the wall, a Wilson crane, operated by compressed air, is used, the crane being supported on the wall, as shown in the cut, and moving forward as fast as the wall is laid up.

The preparing of the wall footings on the steep ledge slopes has required constant attention and study, as the formation of the rock encountered varies greatly and it is necessary to obtain a level foundation without shattering the rock on which the wall is to be built. The boldness of the topography of the location allows the engineers almost no latitude in changing alignment to meet conditions encountered in excavating wall footings.

Inasmuch as the cranes which build the walls must be supported on the wall already built, it has been found advisable in many places to build the wall in two or more stages, so that the lower level of the wall may be used

considerable, and as distances are comparatively great, several boilers would be necessary, with additional men. Air is furnished from a compressor plant located on the north slope of Storm King and is transmitted to the work through 27,000 ft. of air line, ranging in size from 2 to 6-inch. In hot weather, condensation is rather troublesome and numerous blow-offs must be provided, but no trouble is encountered in cooler weather.

The compressor plant is one formerly used in the construction of a section of the Catskill Aqueduct and was purchased from the Oscar Daniels Company. It consists of an "Imperial" Ingersoll-Rand compressor of 1,300 cu. ft. capacity per minute, driven by a 200-h.p. General Electric motor. Power is furnished by the Central Hudson Gas and Electric Company. The load on the compressor is made up of 15 Bull Moose drills and 10 jackhammers, all made by the Ingersoll-Rand Company, 2 Wilson cranes and 4 derricks. Pressure is usually maintained at about 90 pounds.

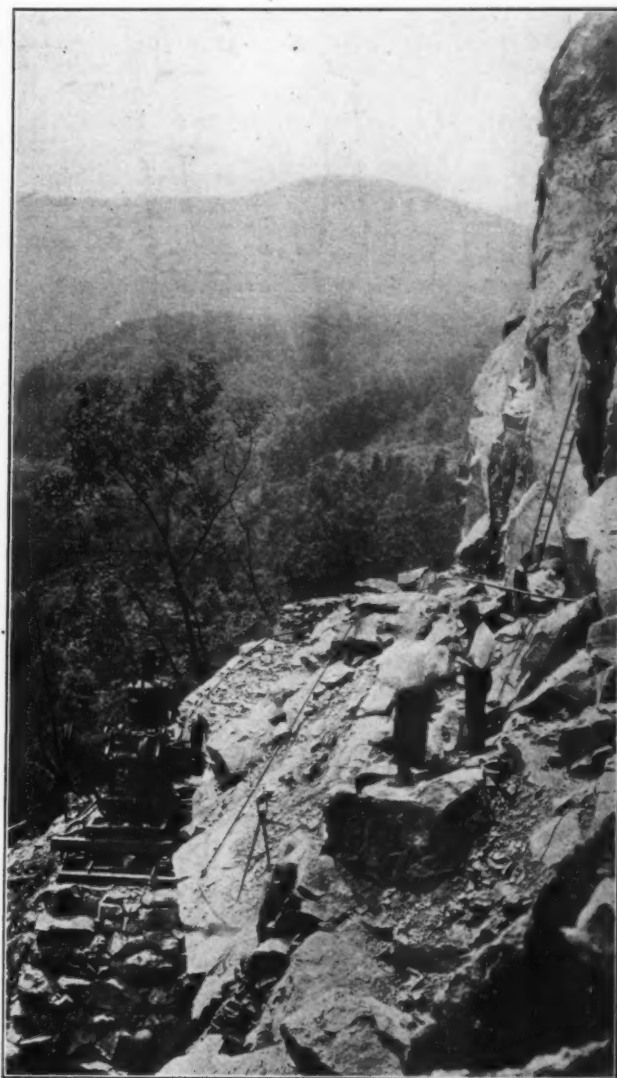
Of necessity, hand methods prevail largely in bringing construction materials to the work. Sand and cement are brought by boat to a point on the river bank, near the work, carried by hand across the railroad tracks and hauled by mule and stoneboat up the precipitous mountainside to the road. At Storm King, where the Storm King Stone Company held up the state for some time, it was necessary to take one of the cranes to pieces and pack it 12 miles by a trail cut over the mountains. A



CRANE WORKING ON RETAINING WALL FOR ROAD AT STORM KING.

as a roadway on which to transport material to complete the wall.

All the machinery, with the exception of the steam shovel, is operated by compressed air. This was a practical necessity as the cost of transporting coal up the mountainside would be high (coke is used for the steam shovel), little space is available for steam pipes and the danger of accidents due to burns resulting from the hot pipes is great. Also the heat loss would probably be

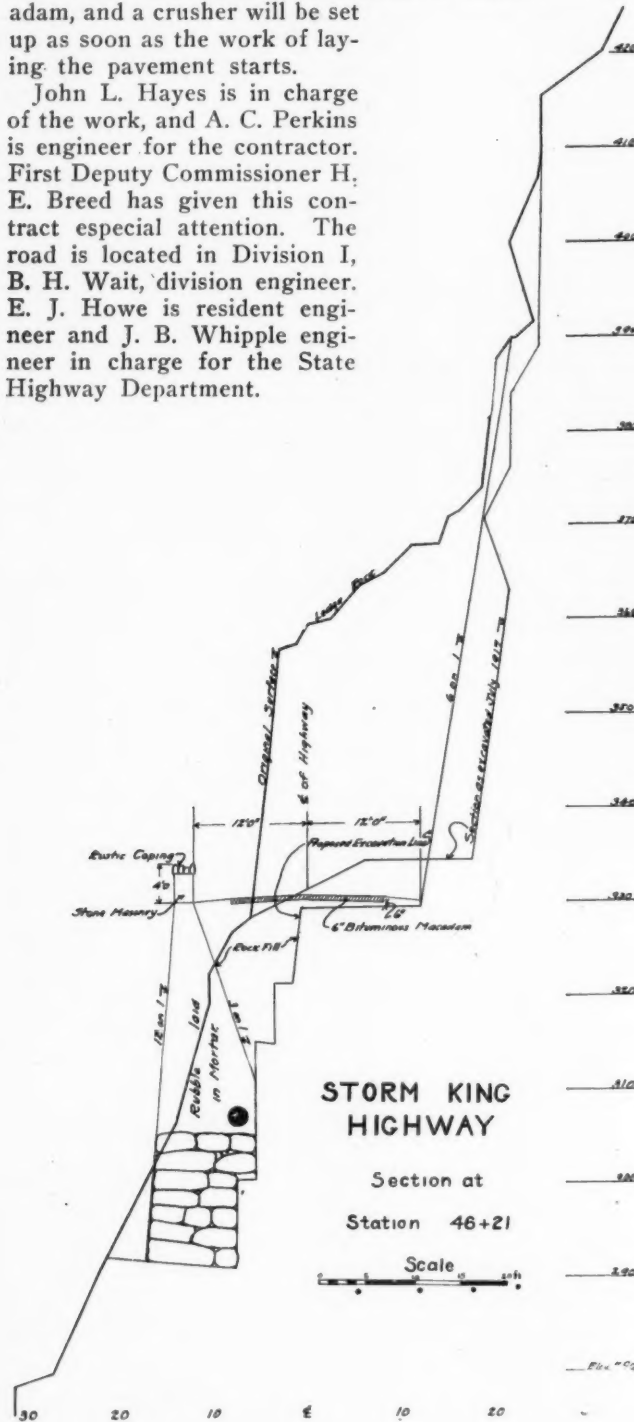


CUT ON FACE OF STORM KING, RETAINING WALL AND CRANE.

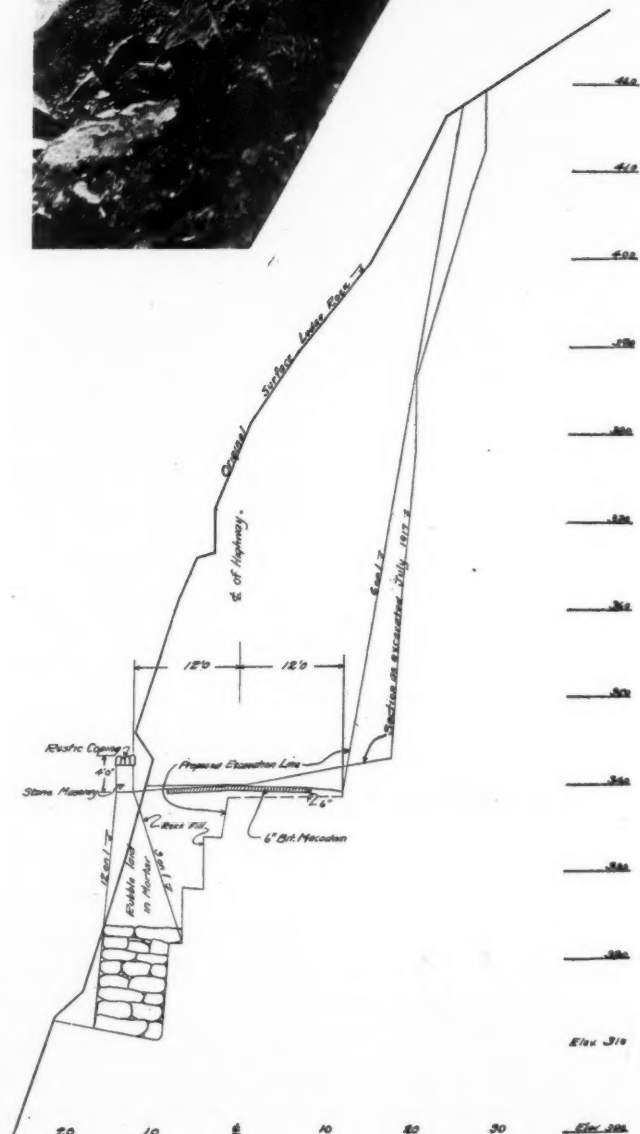
hand-operated cable road also has been maintained for hauling where it is too steep for horses or mules.

The rock is a tough gneiss which fractures with very sharp edges. Du Pont 40 per cent dynamite is used for blasting, but no large blasts have been set off, the largest to date firing about 400 pounds of dynamite. A short time ago motion pictures were taken showing construction work and blasting. The stone is suitable for macadam, and a crusher will be set up as soon as the work of laying the pavement starts.

John L. Hayes is in charge of the work, and A. C. Perkins is engineer for the contractor. First Deputy Commissioner H. E. Breed has given this contract especial attention. The road is located in Division I, B. H. Wait, division engineer. E. J. Howe is resident engineer and J. B. Whipple engineer in charge for the State Highway Department.



The sections above and at the right show the amount of rock necessary to be moved and the difficulties to be overcome by the contractor in constructing the road along some of the steeper places. In the section above, the base of the retaining wall is nearly 40 feet below the finished roadway and excavation had to be carried on between elevations 290 and 410, 120 feet in all. On the section shown on the right it was impossible to get a foothold, and men were lowered by ropes to do the preliminary drilling. The photograph above and on the right shows the view south from station 110 at Crow's Nest. The right-of-way can be seen on the next point.



MANHOLE FOR SEPARATE SEWERS IN SAME TRENCH.

The city of Piqua, Ohio, has constructed systems of house and storm water sewers and occasionally it has been more convenient and less expensive, with the material found in the trenches, to put the two sewers in the same trench. This is almost always possible in reasonably level country because the house sewer must be deep to serve the cellars of houses on abutting property, and the storm sewer need be deep enough to serve only the street inlets and catch basins.

The accompanying illustration shows the design of a combined manhole for the two sewers which does not interfere with the alignment of either sewer and still keeps them entirely separate. In the manhole shown, the storm sewer is a 4-foot concrete sewer and the house sewer is of 24-inch vitrified pipe set in concrete immediately under the bottom of the storm sewer.

The section of the manhole shows the bottom of the sewer through the manhole to be of split 24-inch pipe with the tributary entering at the bottom. Frequently, if not always, the branch sewer can enter slightly above the bottom if so desired. The sides of the sewer are brought up vertical to the invert of the storm sewer, in the concrete of which is placed a rectangular, cast-iron frame *b*. (This is shown in cross-section in the manhole drawing and in plan and end view in the detail drawings.) In the proper recesses in this frame is set the manhole cover of the house sewer *c*, with ribs projecting downward to rest on rubber gaskets *e*, to make the joints gas- and water-tight. To hold the cover in place, cam-shaped latches *d* are provided which turn on pins. The pins may or may not be provided with threads. A half turn of each of the two latches turns the larger side into a recess in the frame and they wedge the cover down to a tight bearing. The cover is very nearly fool-proof, especially if the latches are attached to the pins so that they cannot be lost when the cover is removed for inspection of the house sewer. The cover need not be designed with reference to its removal through the street manhole opening. Indeed, it will ordinarily be larger.

To provide for ventilation of the house sewer, there are six 2-inch iron vent pipes opening at the bottom above

the water level of the house sewer and at the top in the manhole well above any possible water level in the storm sewer. The street manhole cover is perforated.

The structure was designed and built by Albert Schroeder, city engineer of Piqua, and is reported to be satisfactory both as to economy of construction and ease and certainty of operation.

The house sewer cannot be examined when storm water is flowing, but that is seldom or never desirable. Storm water can, on occasion, be used for flushing the house sewer when the depth of flow in the storm sewer is not too great to prevent removal of the manhole cover of the house sewer.

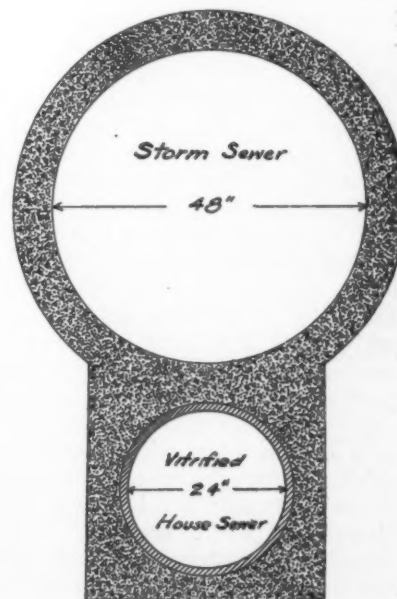
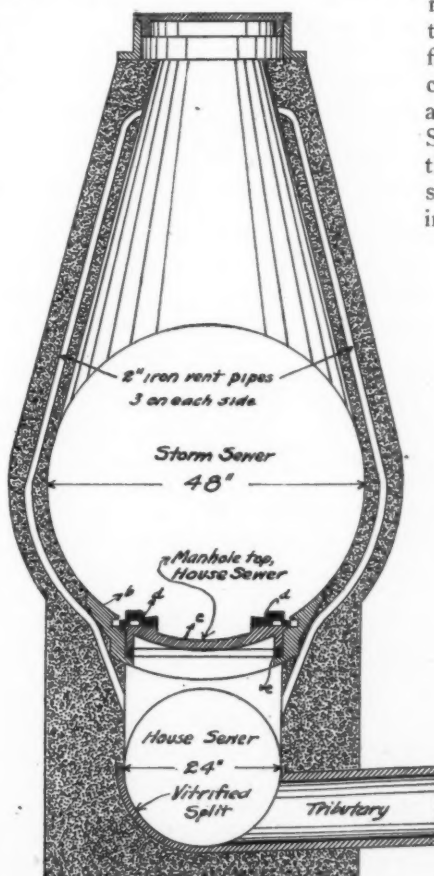
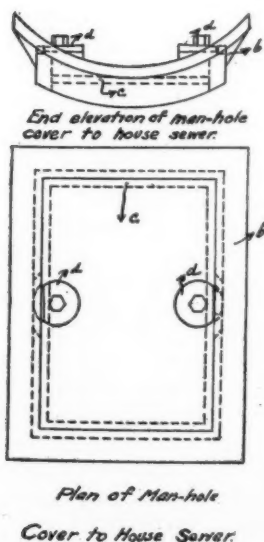
SEWAGE DISPOSAL AT FITCHBURG

Report on Operation During Year 1916—Scum and Sludge in Imhoff Tanks—Growths and Ice on Filter—Handling Sludge.

The sewage disposal plant of Fitchburg, Mass., has been described in previous issues of Municipal Journal, and reference made to some of the early experiences in its operation. The reports of David A. Hartwell, superintendent of sewers, and of F. W. Jones, supervising chemist in charge of the plant, detailing the operation of it during the year 1916, contain many interesting items, many of which may be of value to those in charge of similar plants elsewhere.

At the time of beginning the construction of this improvement, the sewers were all on the combined system; and most of them have remained so, although it is proposed to change them to the separate system as soon as possible, and all of the new sewers have been built upon the separate system.

Some of the connections with the trunk sewer which brings the sewage to the disposal plant are provided with regulators intended to permit only three or four times the dry weather flow to enter the trunk sewer, the excess volume in times of storm being automatically discharged into the river. Such regulators need frequent attention to prevent clogging and the consequent discharge of all sewage into the river. The steady and con-



CROSS-SECTION OF MANHOLE AND OF SEWERS BETWEEN MANHOLES.

siderable increase in the volume of sewage to be treated, caused by the entrance of storm water, undoubtedly increases the difficulty of operating the disposal plant at its maximum efficiency. Ordinarily when the amount of storm water becomes very considerable and there seems no probability of immediate decrease, a blow-off in the siphon at the river crossing is opened and the diluted sewage is turned into the river.

The working of the Imhoff tanks as a whole has been very satisfactory. No foaming occurred, and the scum has varied in thickness from practically nothing in some sections to $3\frac{1}{2}$ feet in others, but was inoffensive. The scum is thicker in the chimneys than in the side vents, and thicker in the end chimneys than in the middle ones. It was allowed to remain undisturbed, except that holes were poked through it occasionally to permit the gas to escape.

During June, owing to continued wet weather and the fact that three of the tanks were full of sludge owing to pumping therein the sludge from the secondary tanks, the efficiency of sedimentation was greatly reduced and the surface of the tanks became unsightly with sludgy froth. The average removal of settleable solids during this month, as measured by readings of the daily composites in the conical glasses, was only 80 per cent, while it averaged 97.5 per cent for the other months. As soon as sludge was withdrawn from the full tanks, the froth disappeared and the tanks produced the usual good results.

The amount of total suspended matter removed by the tanks, taken by months, varied from 43 per cent in June to 78 per cent in July, averaging 70 per cent. In addition to this, dry sludge from the secondary tanks was added amounting to about 13 per cent as much as that settling out in the Imhoff tanks. The flow was reversed five times and measurements made from time to time showed that, after the hopper bottoms are filled, the depth of sludge in each tank remains uniform.

On July 17 a green growth covered the surface of one tank and appeared in smaller amounts on the other tanks. Chloride of lime was sprinkled over the surface, and the next morning the growth had disappeared.

The slots are poked almost daily to prevent floating patches of sludge, and the surface is skimmed when necessary so that the tanks usually present a well-kept appearance.

The detention period, with five tanks in use, has varied from two hours with a rate of 10,000,000 gallons, to ten hours or more when the rate fell below 2,000,000 in the night. With a rate of 3,000,000 gallons the detention period is seven hours.

The sprinkling filter treated an average of 1,399,200 gallons per acre per day when the whole bed of 2.1 acres was in use. During a period of about five weeks eight distribution lines were shut off, leaving 1.14 acres to treat the entire flow of 74,705,000 gallons, or an average of 1,909,000 gallons per acre per day. During this period the effluent was of good quality and nonputrescible. During the succeeding three days that portion of the bed that had been out of service was operated alone, and the final effluent was very brown and cloudy and was unstable. This was the only instance during the year when the methylene blue bottles lost color.

During the summer a heavy growth covered the surface of the filter, which could be peeled off readily in thick leathery chunks. On the under side of this growth were found bunches of small red worms and thread-like white worms. Both of these kinds were found also on the stones beneath the surface. Although the growth was profuse, there was no pooling whatever on the filter at any time, and when the filter was shut off

the growth dried up and for the most part was washed away when operation was resumed.

During the first week of April, when the sewage flow was high due to thaws, the whole filter was by-passed and the surface stones loosened to a depth of about 8 inches with picks. The odor was not dissimilar to that of a salt marsh. The stones were dirty, but after operation had been resumed and the unloading began, they became clean and healthy. The bulk of the unloading occurred in June.

Small white flies (commonly found around sprinkling filters) caused comparatively little annoyance this year, being neither numerous nor troublesome. The cold spring and abnormally wet weather in June may have accounted for their non-appearances.

Under regular operation there was little stoppage of the nozzles, matches which passed through the Imhoff tank screens constituting more than 75 per cent of the material removed from them. In winter, growths detached from the dosing tank walls and distribution pipes caused some trouble and accounted for most of what few nozzles were found frozen.

Ice on the filter has not been a serious handicap to its operation. When the weather is intensely cold and the wind strong, ice appears as "nubbles" over the entire surface, but as soon as the wind dies down the bed becomes clear except for ice "doughnuts" around the nozzles.

The crude sewage is coldest during thaws, sometimes reaching 35°. On February 14, the coldest day of the year, the air reached a maximum of 18° and a minimum of -5°, while the crude sewage had a maximum of 47.3° and a minimum of 43.3°, the Imhoff effluent had a maximum of 45.1° and a minimum of 39.7°, the sprinkling filter effluent had a maximum of 35.6° and a minimum of 32.9°, and the final effluent had a maximum of 35.2° and a minimum of 32.0°. A test made during the second day of a hot spell showed the air temperature to have a maximum of 92° and a minimum of 68°, crude sewage, 68.4° and 68.0°, sprinkling filter effluent 73.8° and 71.2° and final effluent 75.2° and 71.6°.

The final effluent from the secondary tanks was well saturated with dissolved oxygen, odorless and more attractive in appearance than the river into which it flows.

The average specific gravity of the sludge as it entered the sludge bed varied from 1.047 to 1.081, averaging 1.065; the per cent of solids varying from 11.36 to 17.02 and averaging 14.90. The sludge had a tarry but not unpleasant odor, was strongly alkaline to lacmoid but not to phenolphthalein, and at no time caused any nuisance. In order to insure a more uniform depth of sludge on the bed, it was necessary to use a large squeegee which one man can push readily along the rails of the track. The average depth for all but the last dose was 8.9 inches; but in the latter part of October, the last sludge removal until spring, 11.5 inches was discharged upon the bed and allowed to lie there all winter. It was found that while a depth of 10 to 12 inches requires too long a period to dry, a depth of 8 to 9 inches requires little longer than 6 to 7 inches and is therefore more satisfactory.

The summer was very wet and rain came within 48 hours after each pumping of the sludge, and it is not known how long it would require a sludge to dry if not rained upon. As soon as it became stiff it was turned with mason's hoes, which hastened the drying appreciably.

Careful estimates were made of the quantity of sludge handled and representative samples were taken, for analysis, of both wet and dry sludge. The importance of proper and frequent sampling has been demonstrated

and too much emphasis cannot be placed on this part of the work.

The shrinkage in volume of sludge between pumping and removal varied from 52.8 per cent to 61.7 per cent, averaging 55.9 per cent. The weight per cu. yd. as hauled varied from 1,278 to 1,559 pounds, averaging 1,415. With each cleaning 4 to 5 cu. yds. of sand were removed from the bed with the sludge, to the bottom of which it adhered. About 6 to 8 cu. yds. of rakings in addition to the sludge was taken from the beds at every cleaning.

The sludge has been disposed of in various ways. A small amount has been carted away by farmers, some has been used for filtering, some for fertilizing the shrubs planted in the grounds around the disposal works, and some as top dressing on the adjacent land. To test its fertilizing value, 1/15 of an acre of poor, sandy, virgin soil was planted with potatoes, using sludge only as a fertilizer. A crop of 12 bushels was harvested, of good size, clean and without a single rotten potato. The cost per cubic yard for removing the dry sludge averaged 41 cents, this including crating and preparing the bed for the next pumping. Labor was paid 32 cents per hour, team and driver 75 cents, and foreman 40 cents.

WATER CONSUMPTION ESTIMATE.

The water commissioner of St. Louis, Mo., Edward E. Wall, in 1914 prepared an estimate of the probable consumption by the city for the next few years. Comparison of this estimate for 1916 with the actual consumption during that year is interesting. The figures (in millions of gallons) are as follows:

Period of Time	Estimated	Actual
Average daily consumption for the year	93.6	97.6
Average daily consumption per maximum month	117.0	118.4
Consumption for the maximum day...	140.4	133.7
Consumption rate for maximum hour.	210.6	210.5

BLOWING DUST FROM MACADAM.

In preparing macadam roads for the application of tar or oil, it is generally desirable to remove all dust from the top of the road to permit the bituminous material to penetrate the stone. Where a portable air compressor is available, this can be done by blowing it off; which is the best way, for it cleans out the upper interstices, while brooming only packs the dust into them. One plan is to attach to the end of the air hose a T-shaped set of pipes formed of a T and three pipes, a row of small holes being drilled in line in the two pipes that are fastened in line in the opposite openings of the T. This set of pipes is held in the hand or may be fastened under the wagon carrying the air compressor so as to come an inch or two above the road surface and with the air jets making a slight angle with the vertical, blowing the dirt in the direction in which the wagon is moving.

COMPULSORY FLUE CLEANING.

In his annual report for 1916, George Wead, fire marshal, of Houston, Tex., recommends the passage of an ordinance making it compulsory on property owners and tenants to clean the flues of their buildings every year, and fixing a maximum price for the work. The cleaning should be done under the supervision of the fire marshal, and records kept. When a fire occurs that can be attributed to unclean flues, a penalty should be imposed. Marshal Wead states that nearly 30 per cent of the fires are due to unclean flues, and that this percentage can undoubtedly be reduced considerably by the enactment of this ordinance.

COST OF CONSTRUCTING PAVEMENTS IN ST. PAUL BY FORCE ACCOUNT IN 1916.

Street or Ave.	Foundation	Type	Cost of Foundation Materials.				Cost of Wearing Surface Materials.				Cost Per Sq. Yd.								
			Cement, per cu. yd.	Gravel, per cu. yd.	Asphaltic Cem. ton.	Asphaltic Sand, cu. yd.	Coarse Sand, cu. yd.	Limestone Dust, ton.	Binder Stone, cu. yd.	Asphalt Filler, sq. yd.	Pitch Filler, ton.	Creosoted Bl. Pav.	Brick Paving.	Brick, sq. yd.	Concrete Foundation.	Wearing Surface.	Miscellaneous.	Net Cost.	Total Pay-Ing Cost.
Canada	5" Concrete	2" Asph. Con.	5.539	\$1.00	\$1.80	\$16.40	\$0.85	\$0.74	\$3.60	\$2.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fourteenth	5" Concrete	2" Asph. Con.	6.227	2.07	1.95	16.40	.85	.74	3.60	2.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mississippi Blvd.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Prescott	5" Concrete	2" Asph. Con.	4.670	1.75	1.84	16.40	.85	.74	3.60	2.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wacouta	5" Concrete	2" Asph. Con.	2.352	2.12	1.00	16.40	.85	.74	3.60	2.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
Eleventh	5" Concrete	Brick	1.594	2.07	1.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oakdale	5" Concrete	Brick	1.565	1.75	1.15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
State	5" Concrete	Brick	2.405	1.75	1.15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Como West	5" Concrete	3 1/2" Creo. Blk.	839	1.84	1.25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Eleventh	5" Concrete	3 1/2" Creo. Blk.	2.945	2.07	1.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Grove	5" Concrete	3 1/2" Creo. Blk.	5.229	2.07	1.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Holly	5" Concrete	3 1/2" Creo. Blk.	9.010	2.25	.90	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Summit	5" Concrete	3 1/2" Creo. Blk.	562	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wright's Re.	5" Concrete	3 1/2" Creo. Blk.	1,239	2.07	1.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

WORK ON CALUMET INTERCEPTING SEWER

Excavating in Quicksand and Clay with a Steam Shovel and Drag Line—Handling Excavated Material and Concrete Aggregate.

By ALBERT R. REILLY.

On Section 7 of the "Calumet Intercepting Sewer" is an outfit similar to those of other sections being built for the sanitary district, yet more complete and individual than any.

This contract, which connects into the Calumet-Sag Channel, and is over two miles in length, is being constructed by T. J. Foreschuer & Co. The "Croton" section is used, the arch being 18 in. at the crown, with side walls 3 ft. 9 in. and minimum thickness of invert 21 in. The opening is 16 ft. wide by 16 ft. high. The concrete is mixed 1:2½:4½.

The excavation is in 5 to 10 ft. of sand and top soil, the remaining 20 to 25 ft. being blue clay. Quicksand is encountered in places, requiring the use of sheathing.

The material storage, shop, storehouses and offices are located at about the half-way point, near the Panhandle track crossing.

Separate service tracks supply concrete material to the mixer, and take away the excavation to the spoil area located one mile east of the discharge chamber, on the Panhandle R. R. property.

A Marion special shovel with a 40-ft. boom and 2½-yd. bucket excavates the top 10 to 12 ft. of the ditch, which is cut about 60 ft. wide. This allows of a considerable settlement and drying out of top strata before the "drag-line" comes along. A gasoline pump keeps the water out.

Three Vulcan locomotives with 10-car trains of Western side-dump, 6-yd. cars on a standard-gauge track carry the dirt to the spoil area. These trains also serve the "drag line."

The drag is a Bucyrus with a boom and 2-yd. Page bucket. A special bucket is required to dig the clay, which must be cut vertically. The cut is later trimmed by hand by four bottom-men.

The material dug is hauled by train to the back-fill, where eight men and a foreman dump cars, clean up, and shift track. The surplus goes to the spoil area.

The service to both machines is good, allowing the drag to dig approximately 800 yds. per day. The shovel could dig 2,000 yds. if necessary.

One man besides the runner and fireman manipulate the drag. Four laborers are required to run the shovel, besides the runner, boom-man and fireman.

One brakeman on each train spots cars, throws switches, etc.

One foreman and eight men dump cars, move track, etc., on the spoil area dump.

CONCRETING.

The material is unloaded from cars on a spur of the Panhandle R. R., which bisects the job, by a Brown hoist, which places it in bins which hold about 18 cars of stone and 6 of sand. The bins have a total length of 140 ft., are 9 ft. high and have 8 ft. wide clearance. The narrow gauge tracks (36-in.) run under the bins, allowing trains of ten Easton cars of tipple type, hauled by Vulcan "dinkies," to pass under and be loaded from chutes in the bottom of bins.

Into these cars the stone and sand are loaded in the right quantities for the mix used. The train now goes to the cement platform, which is so located that bags are carried directly from the railroad cars and dumped into service cars, making each car carry its 40 cu. ft. to the mixer.

Two cement sheds of six-car capacity are located on the spur. Sand and stone are stored on the ground between the spur and the main line.

Three Vulcan dinkies with 30 cars of Easton type serve the mixer. Each has a brakeman and an engineer.

Four men help at bins and clean cars with the hoist. Four men handle cement.

The mixer, a special Foote of 40 cu. ft. capacity, is provided with flanged wheels which run on a standard gauge. Outriggers of 6 in. I-beams, with hooks and jacks, provide stability against the drag of a 35-ft. chute.

Four men besides the dumper and engineer dump cars and move track. One man handles the chute and two move concrete forms.

The mixer's capacity is about 350 yds. in a ten-hour day, or 50 ft. of sewer, mixing one minute.

The forms are Blaw steel forms in sections 25 ft. long, seven sections being used. They are moved after 48 hrs. by four men with the aid of a gasoline engine. The forms are collapsible and are moved forward by night in units. Four carpenters set bulkheads, braces and other wooden forms for the arch.

The blacksmith shop and its two workers, with the office and its material-clerk, timekeeper and straw boss, complete the employed.

Ralph H. Burke is division engineer and S. Mehner is resident engineer.

USING OLD STONE PAVING BLOCKS.

In Cleveland, Ohio, a new lug wood block pavement is under construction on Euclid avenue, taking the place of an old Medina stone block pavement, much of which has been in use for many years. At the time the stone block pavement was laid, the requirements as to dressing of the blocks to parallel faces and straight edges were not so strict as at present, and the years of wear have not improved their appearance. Nevertheless, the city is relaying the blocks in what must be a temporary pavement on the driveway passing the new court house and the new city hall, which are on the corners of Cleveland's great plaza nearest the lake. These two buildings are the only ones yet constructed at the north end of the plaza and the extension of the space north, to connect with the proposed new Union railroad station and park beyond, is yet to be made. When this construction is nearer completion a handsome pavement will be required. Meantime the temporary pavement is being put in, using the old materials from Euclid avenue. The pavement is laid on the graded natural soil with a sand bed on top of a depth sufficient to insure a firm bearing for all blocks, whatever the variations in their depth may be. On account of the irregularity of the blocks, the joints are far from uniform, and near the surface of the pavement are often very wide. The joints are filled with a bituminous filler of which a very large quantity is required, and sufficient sand is spread over this to cover it. The stones are tamped into place with hand tampers immediately before the hot bitumen is poured.

Curbs are also omitted, the cross-section showing a gutter formed by paving a slope up to the elevation of the lawn and sidewalk. It is questionable whether this construction is economical under the circumstances.

SEWER HOUSE CONNECTIONS IN FITCHBURG.

House connections with sewers in Fitchburg, Mass., are usually constructed wholly by the sewer department, but the owner is allowed to do the digging and back-filling of the trench on his own land if he desires to do so. All of the pipe, however, is laid by an employee of the department. The cost of all work between the building and the main sewer is charged to the owner of the building.

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Change of Address.

Subscribers are requested to notify us of changes of address, giving both old and new addresses.

Contributed Articles and Reports.

Contributions suitable for this paper, either in the form of special articles or as letters discussing municipal matters, are invited and paid for.

City officials and civic organizations are particularly requested to send Municipal Journal regularly their annual and special reports.

Information Bureau.

Municipal Journal's Information Bureau, developed by twenty-one years' research and practical experience in its special field, is at the command of our subscribers at all times and without charge.

THE DEMAND FOR ENGINEERS.

A few weeks ago, soon after the United States entered the war, it looked as though our colleges would be almost deserted for the next year or two, so general was the ambition among the students to enter some branch of the militant forces of the country. At that time certain federal officials endeavored to stem this rush to abandon their studies by pointing out the necessity which would exist during the war, and still more that which would arise after the war, for the services of technically trained men; and they urged not only that those who were now engaged in technical studies continue these to the end of their course, but also that considerably greater numbers should begin such courses at once in order that they might be prepared at as early a date as possible to assist in the reconstructing of destroyed utilities in Europe, and the development along the most modern lines of those in the recent republic of Russia and possibly in other countries whose future may be directed by the war into more ambitious and modern lines.

This protest against the emptying of the technical schools has, we believe, had some effect, and we hope to see the classes entering these schools next fall greatly increased in number over those of the past. This will provide engineers four years from now, but it is hoped that the demand occasioned by peace will arise within one or two years; and if it is to be met, it must be met by the students who next year will be in the junior and senior classes. We do not know what view the exemption boards will take of this matter, but it is to be hoped that they will refuse to draft into any service men who are engaged in technical studies along lines which will be of service in the reconstruction and enormous develop-

ment which will undoubtedly follow the establishing of peace.

When war broke out, most of the engineering schools abroad shut down wholly or partially, both students and faculty devoting themselves to some form of military work, and engineers and other technical men who entered the army have been greatly reduced in numbers on the battlefields. There is every indication, as stated above, that during the next few years the demand for technically trained Americans will be at least double what it has been in the past, and an opening will be offered for engineers such as that profession has never previously known.

UTILIZING TRADE WASTES.

The United States has experienced a jolt during the past year that has brought it to a partial realization of how extravagant it has been in the past, and an effort toward greatly increased economy as well as efficiency is now being made in all directions and by all classes. We have referred in previous issues to the saving of food before it reaches the garbage pail rather than endeavoring to recover from it afterward a much smaller value by utilization processes.

Another form of saving on which the Federal Government is working is in connection with trade wastes. The Public Health Service has for some time been seeking to assist manufacturers in avoiding the pollution of streams with their trade wastes. When this technical and diplomatic work was first started the former was confined to developing satisfactory and economical methods of purification; but so much material was found getting away with the liquid wastes that it seemed advisable, especially under present conditions, to include the recovery of waste products as part of the regular investigation. Much of the sludge or solids recovered from several kinds of plants (tanneries, for example) have been found to have considerable fertilizing value; for the sulphide wastes from paper plants several uses have been found, and it may be accepted as almost certain that if our chemists will turn their attention more earnestly in this direction and the manufacturers will encourage them and sufficiently appreciate the importance in the aggregate of what may at first seem to be small returns, some use may be made of almost every class of waste. Past history is full of illustrations of enormous profits obtained by recovering valuable by-products from ore tailings, fumes and other solids, liquids and gases which previously had been carelessly thrown away.

A "GOOD ROADS" ORATOR'S HANDBOOK.

We doubt if there is any subject upon which so many millions of words have been spoken during the past five years as that of good roads. A publication several times the size of Municipal Journal could be filled weekly with clippings from daily newspapers, reports of good roads organizations, etc., giving speeches on the subject. And probably all the arguments and figures worth giving could be boiled down into one speech of moderate length.

This boiling down has actually been done by the U. S. Office of Public Roads, which has prepared, for the benefit of those who wish to speak on the subject, a standard lecture, accompanied by a series of notes on all features of the subject, from the initial work of arousing interest in good roads to the maintenance of the roads after they are built. This should serve a good purpose, for undoubtedly many public officials are called upon at times to speak on the subject who have little definite and reliable information concerning it, and use of this handy speaker's manual should result in making their speech more informative and of real assistance to the good roads movement.

EXPERIMENTAL ROADS IN IOWA

Results of Experiments with Bituminous Carpet Coats on Gravel and Concrete—Oil Recommended—Method of Applying.

Two experimental gravel roads, one on the Hawkeye Highway leading out of Fort Dodge and the other leading out of Rockwell City, built in 1915, were given bituminous carpet coats in 1916. The Fort Dodge road came through the winter in good condition for treatment. The one at Rockwell City became uneven and wavy and had to be scarified, reshaped and rolled before being treated.

In carrying out the work, in each case, the road surface was swept with a horse-drawn sweeper to remove the dust. Liquid asphalt was then applied cold, at the rate of one-half gallon per square yard in two applications of one-fourth gallon each, by means of a pressure distributor. Following the second application, coarse sand was spread over and broomed on the surface. Patrolmen were kept on the road for several days, adding additional sand where needed and spreading it over the surface. The oil asphalt used had the following analysis:

Specific gravity at 97° F.....	9597
Specific viscosity, 100 c.c. at 50° C. (Engler).....	31.0
Loss on heating 5 hrs. at 163° C.....	18.65%
Character of residue.....	Thick and sticky
Total bitumen.....	99.89
Bitumen insoluble in 86° naphtha.....	8.49
Fixed carbon.....	6.12
Ash.....	.21
Flash point (open cup).....	144° F.
Burning point (open cup).....	165° F.

The same type of oil asphalt and application method were used on four miles of the Des Moines-Ankeny road. Two miles of the road were treated with a different grade of oil, one which had proven very satisfactory on earth roads of medium traffic.

Results so far have not been conclusive in the case of the gravel roads. On the Fort Dodge road the surface was found in very good condition. The Rockwell City road had been badly damaged by the passage of heavy tractors. The Des Moines-Ankeny road demonstrated that a bituminous carpet will not hold upon a cinder surface under heavy traffic. The mat wore away in spots, due to crumbling of the cinder road bed underneath. The portion treated with ordinary road oil also became uneven, but not to the same extent.

In 1915 an experiment was started to determine the relative value of different materials for bituminous carpets for concrete roads. A road at Mason City was treated with a number of materials as follows:

Length.	Nature of Treatment.
620 feet	½ gallon tar in one coat.
130 feet	Binder coat of tar followed by ¼ gallon soft natural asphalt.
90 feet	Binder coat of tar followed by ¼ gallon soft oil asphalt.
525 feet	½ gallon per sq. yd. of mixture of 80% oil asphalt and 20% natural asphalt.
80 feet	½ gallon per sq. yd. of oil asphalt.
225 feet	½ gallon per sq. yd. of a mixture of 80% natural asphalt and 20% oil asphalt.
60 feet	Binder coat of natural asphalt cut back with naphtha followed by ½ gallon of natural asphalt.
100 feet	½ gallon per sq. yd. of natural asphalt.

The surface was dressed with trap rock chips of a size that would pass a ¼-inch screen.

On several sections the surface peeled off along the wheel track and this continued and extended until little of the bituminous material was left. Generally speaking

the sections upon which oil asphalt was used deteriorated most rapidly and the tars next, while the fluxed asphalt has held up very well. The naphtha-fluxed binder coat was a help.

In September, 1916, the concrete roadways on the campus at Ames were given a bituminous carpet coat. The same type of liquid asphalt as was used on the experimental gravel road was applied. The work was carried on in practically the same manner, except that the asphalt was heated to about 150° F. before application. The concrete roadways had been treated previously in October, 1913, but the road had worn away so that re-treatment was advisable. An application of one-third gallon per square yard restored the roadway to good condition.

CLEANING CATCH BASINS IN FITCHBURG.

During the year 1916 the total number of catch basins in service in connection with the sewer system of Fitchburg, Mass., averaged 956, sixteen having been constructed during the year. There were 1,277 cleanings of basins during the year, or an average of one and one-third times per basin. The average amount of silt removed was 2.16 cu. yds. per basin. The cost of removal was \$2.86 per basin, or \$1.32 per cu. yd., these costs including the hauling and disposal of the material. Labor was paid 32c. an hour. Disposal of material taken from the catch basins is becoming a more and more difficult problem as the city increases in population.

Figures for the past five years show that the amount removed per basin has varied from a minimum of 1.88 cu. yds. in 1912 to a maximum of 2.48 in 1915; while the cost per basin has varied from a minimum of \$2.67 in 1912 to a maximum of \$2.99 in 1915; and that the cost per cubic yard removed has varied from a minimum of \$1.20 in 1916 to a maximum of \$1.42 in 1912. As laborers were paid 25c. an hour in 1912 and 32c. in 1916, it is apparent from these figures that the work was done more economically during the latter year.

TRENTON WATER WORKS NOTES.

In his latest annual report, Alvin Bugbee, superintendent of water works of Trenton, N. J., presents some figures which are very creditable to the operation of that plant. One of the most interesting points brought out was the reduction in consumption which had been effected. The total consumption per day had averaged about 12,000,000 gallons in 1908, and had increased to 22,000,000 gallons in 1913. If a similar increase had been allowed to continue it would have required a new reservoir and new pumps at an early date, at an expenditure of about \$1,000,000. The department decided to endeavor to avoid this expenditure by diminishing the consumption. Houses were inspected for leaks, and leaks in mains which did not show on the surface were detected by pitometer tests. In addition, meters were installed where it was believed there was considerable waste. The result of this was a reduction of the consumption from 22,000,000 gallons per day in 1913 to 15,000,000 gallons in 1915, in spite of the additional number of consumers caused by the growth of the city.

The pumping plant spent \$800 less for coal in 1916 than in 1915, although pumping 100,000,000 gallons more water, the coal costing the same per ton both years. The high-service station had been operated by gasoline, but when the price of this jumped to 20c. per gallon, costing the plant \$350 per month for fuel, they had the gasoline engines changed over to operate as gas engines at a cost of \$115 for both engines, thus saving \$150 per month in cost of fuel.

The WEEK'S NEWS

A National Highway System Proposed—State Health Legislation in Oklahoma and Indiana—Waterworks Improvements in Los Angeles and New Brunswick—Prescribed Accounts for Utility Companies—New York City's Fire Department—Election Results in Dayton, Petersburg, Va., Columbus and Bridgeport—Garbage Collection and Disposal Changes in Indianapolis, Spokane, New York, Akron and Canton—New York's Traffic Court—Los Angeles Regulates Billboards—Portland, Ore., New Auditorium.

ROADS AND PAVEMENTS

Automobilists Want National Highway System.

Washington, D. C.—“Now that all the states have been equipped with state highway departments and have adopted the policy of building state systems of main, through-line highways—because the Federal Aid Roads Act is on the statute books—every condition is favorable for the next step, the establishment of a National system of highways,” predicts chairman George C. Diehl of the good roads board of the American Automobile Association. “The next logical step follows the same course which has been pursued by the state governments; namely, the broadening of federal participation to provide for the establishment of a system of national highways. This policy can be put into effect without disturbance of existing organizations, without providing new means of finance, and with but little change in existing law. The process would logically take a course somewhat as follows: First: The state highway departments and the federal office of public roads would make an initial selection from existing state highway systems of those highways which are of interstate importance. Second: A system thus selected would be approved by Congress, with the requirement that Federal funds be applied only to such system on and after a specified date. Third: The federal aid should be extended to maintenance as well as construction, as the national system of highways should have for all time a close relationship to the federal government. Some of the states have already made plans for utilizing the aid granted by the Federal Aid Road Act on roads which could not properly be included in a national system. But this need not cause extreme conflict, as the federal funds for the first three or four years' operation of the present act could continue to be applied as now planned. The appropriations for the first two years are already available and considerable time necessarily must lapse before the national system could be laid out and made ready for the application of federal funds. In all probability, the new scheme would come into effect as an extension of the present Federal Aid Road Act.”

Wins Paving Case in Final Court.

York, Pa.—The state supreme court has refused to allow an appeal to be taken from the superior court's decisions in the contested street paving suits of the city involving East Princess and North Hawthorne streets. The superior court's affirmation of judge Ross' rulings in those cases is therefore final. Speaking of the East Princess street assessments and the contention that the street had been so improved prior to 1914 as to preclude collection of the assessments for paving done in that year, judge Kephart says:

“The work claimed as an original paving was done in 1874 under the authority of council. It consisted of spreading limestone ballast evenly over the roadway, converted into a hard surface by the passing traffic and kept in repair by placing loose stones in the holes or ruts. Without other evidences of intention, this would not be such paving as would exempt the abutting owner from liability for future improvements. Evidence of the same character of work done on other streets would not supply such intention. Indeed it could scarcely be considered as being more than ordinary repairs done to an ordinary dirt road where the traffic is heavy. While due effect must be given to the character of the work done in determining municipal intention, when that work is macadamizing, without other ample evidence it will not be sufficient to show municipal intention. There must be additional evidence of this fact.

“Describing the work as ‘macadam’ by witnesses or in reports furnishes no information as to the manner of construction and the materials entering into its construction. A witness cannot testify that certain methods of construction were employed to change an ordinary dirt road into a permanently improved highway. This calls for a conclusion. The ‘change’ called for is expressive of the municipal intention and such intention must be established by evidence apart from the work done.”

In the other case, only legal questions were raised, there being no claim that the street had been macadamized prior to the paving in question. The point most strongly urged was that the city should not be permitted to assess the abutting owners for street paving because a number of streets had been paved out of money raised by loan bills and by general taxation. It was argued that unjust discrimination would prevail if the assessment method were permitted by the courts. Judge Kephart says in reply to the argument that a large measure of discretion is vested in the municipal authorities as to the method of payment for street paving, due to the character of the street to be improved, density of traffic and other peculiar local conditions, and that uniformity is arrived at so long as assessments are equitable within the area to be improved. He adds:

“We would not assert that a gross abuse of discretion might not be perpetrated in determining what streets or parts of streets should be paved wholly at the city's expense and what streets should be paved at the expense of the abutting owner. This record does not show any discrimination and if it did and it were of such character that a court could interfere, the complaining parties should have moved to determine that question before the city caused a large expenditure of money to be made on the faith of the ordinances providing the improvement. One cannot stand idly by until the streets are paved and then assert that there has been a gross abuse of discretion.”

The superior court also upholds the manner in which the liens had been filed against the property owners and also the plan of issuing improvement bonds resting for their security upon the liens and payable only out of the assessments.

Advertise for a Street Superintendent.

Charlottesville, Va.—This city is determined to have as good a superintendent in charge of street work as it can get and it has advertised over the country for him. City manager Hubert A. Stecker asks for one who has had “experience in street grading and paving work and also in handling men. Man with some engineering training preferred.” Charlottesville has 12,000 inhabitants.

SEWERAGE AND SANITATION

State Approves City's Sewer Plans.

Johnstown, Pa.—Revised plans for Johnstown's sanitary sewer system have been approved by the state commissioner of health, the attorney general and the governor. The city is given a permit to carry out the proposed plans. The time for the discharge of untreated sewage from the existing sewer system into state waters is extended to July 1, 1918. Sanitary engineer C. P. Collins executed the plans for the system. Progress is being made on the main line sanitary sewer. The 63-inch concrete pipe is being manufactured in Cambria city. The trench averages 16 feet in depth. The first eight feet of surface is removed with a steam shovel and the remainder with a Moore conveyor. Work was started on June 1. The sewage disposal plant will be constructed about 4,500 feet below Laurel Run. Members of city council, the mayor and others went to West Taylor township recently and looked over the work being

done on the sewer. The matter of handling traffic over the right of way of the sewer was considered. A temporary bridge across Laurel Run will be necessary. The plans approved by the state officials include those for the main collecting and intercepting sewers, the general system of sewage treatment and the scheme of lateral collecting sewers. The permit says: "Nothing in this permit shall be construed as approval of the discharge of untreated sewage into state waters from the proposed comprehensive sewer system. Prior to completion and use of the main collecting sewer, the sub-mains or any lateral sewers, excepting those for which particular authorization of use has been given, the city shall provide works for treatment of the sewage. During construction no radical changes shall be made in the sewer system as herein approved unless the city shall first obtain a permit therefor from the state department of health. The general system of sewage treatment is approved providing the degree of purification effected is at least equivalent to the standards set forth in the permit of April 20, 1915, but it is distinctly stipulated that this approval is conditioned upon the continuous performance of the works in accordance with those standards. Prior to construction of the incinerating plant for destruction of the screenings, the city shall submit general plans in sufficient detail to enable the state to judge of the probable efficiency of operation. Daily records of the operation of the sewage treatment works shall be kept on forms satisfactory to the state department of health and copies thereof shall be filed monthly in the office of said department. These records shall include results of such bacteriological examinations or other tests as the state department of health may deem necessary for the city to make to properly determine and control the operation of the works."

Sanitary Control of Soft Drinks.

Oklahoma City, Okla.—For the protection of the public health the state board of health has issued the following regulation: "Hereafter individual one service drinking cups shall be provided and used in confectioneries and all other places dispensing soft drinks, or other beverages, where such establishments do not maintain and properly use adequate facilities for the sterilization of glasses or other vessels used in dispensing beverages of all kinds. These shall be destroyed immediately after being used to serve a customer. Drinking glasses for beverages at fountains, etc., shall not be used the second time, unless sterilized in the interim."

Power to Wipe Out Insanitary Town.

Taylorville, Ind.—This town, near Terre Haute, long condemned by the state board of health as insanitary and a public nuisance because of the general unhealthful conditions, is the subject of an opinion from attorney-general Stansbury to Dr. J. N. Hurty, state health commissioner. Many months ago Dr. Hurty announced that conditions in Taylorville were so extreme that the state board had decided to step in and attempt to wipe the place out of existence. Stansbury's opinion says that while the state board has power to abate numerous unsanitary and unhealthful conditions in Taylorville—or any other Indiana town—that the plan for abating the nuisance should be left to the "local authorities and their attorneys." Under an act of the 1917 legislature, as pointed out in the opinion, the state board has wide powers to wipe out any public nuisance. Dr. W. H. Roberts, Vigo county health commissioner, has been discharged by the state board because of conditions here.

Weekly Publicity on Milk and Water Supplies

Charleston, W. Va.—A weekly statement on the condition of the milk and water supply of Charleston will be issued in the future by the city health department, according to the announcement by Dr. R. T. Davis, city health commissioner. The following notice has been sent to the different dairies supplying milk and ice cream to the citizens, and they will be forced to comply with these regulations in the future: "Any person or firm selling milk or its products, must cool the milk to a temperature not exceeding 70 degrees, within one hour of milking and bottling and keep the milk cool until delivered to customers. Ice cream mak-

ers shall pasteurize all milk and cream used in the manufacture of ice cream. No ice cream shall be re-frozen. Ice cream manufacturers shall obtain milk and cream only from approved milk dealers. Raw milk shall not contain more than 1,000,000 bacteria per c. c. before pasteurization, delivery to customer. Pasteurized milk shall not contain more than 1,000,000 bacteria per c. c. before pasteurization nor more than 25,000 bacteria per c. c. after pasteurization. No milk shall be repasteurized. All places where milk and milk products are produced, sold, stored or handled must be at all times in clean and sanitary condition and screened against flies. Commencing July 16, 1917 a weekly report will be made by the city chemist and the report published in the newspapers, of dealers who do not comply with the above regulations, and repeated violations of the regulations will result in the revocation of the dealers' permit to sell milk or its products. Therefore the health commissioner advises all dairymen and manufacturers to keep their places scrupulously clean and fly-proof."

City Advertises for Health Officer.

Goldsboro, N. C.—This city, which recently went under the manager plan, is now looking all over the country to obtain a capable physician to act as health officer. Goldsboro is a progressive city of 11,000. John R. Crawford, chairman, will receive applications until September 5 from those who are "graduates in medicine and qualified to make approved meat and milk tests." The salary will probably range from \$140 to \$150 per month.

WATER SUPPLY

Begin Work on Big Reservoir.

Los Angeles, Cal.—Construction work on the Chatsworth reservoir, which will be a storage basin for 9,000,000,000 gallons of aqueduct water, has been begun by the Los Angeles water department. The first test holes for the foundation of the great earthen dam have been driven. The reservoir will involve the construction of four dams, two dykes and the removal of about 1,000,000 cubic yards of earth. The operation of the power plant at full capacity during "peak" hours will be permitted by the construction of the reservoir. It is estimated that the work of building the dam will continue two years. The area of the basin will be 1,300 acres. It will be three miles long and one mile wide.

New Filtration Plant in Service.

New Brunswick, N. J.—One of the most important improvements the city has had under consideration for many years has been completed, the new filtration plant having been put into operation by the New York Continental Jewell Filtration Company, which has finished the construction work. The standpipe, with a capacity of approximately 800,000 gallons, is also completed and in service. With the additional pressure, superintendent of the water department Charles Morris had some fears that it would work havoc with the old water service pipes in the lower section of the city, and accordingly notified all property owners to have any faulty fixtures repaired. The plant was described in full detail in a recent issue of Municipal Journal.

Rates Doubled for Leaky Fixtures.

Danbury, Conn.—The city council and board of aldermen have passed and the mayor has approved an ordinance inflicting a penalty for the existence of water-wasting leaks on premises. According to an advertisement in the newspapers, the ordinance says that the regular rates "shall apply only where the fixtures, piping, faucets, valves and other conduits of water supply shall be maintained in a non-leaking condition, and if upon an inspection of any property the said pipes, valves, etc., are found to be in a leaking condition the rates for the use of water shall be double the amount stipulated for a period of six months. All hat factories shall be provided with suitable shutoffs on all blocking machines (as provided in ordinance) and with gates on the water pipes whereby the water can be shut off during the hours when the making or sizing department is not in operation. Failure to do so on the part of the own-

ers of said factories (to use shutoffs), the rates for the use of water for said factories shall be doubled. The provisions of this ordinance shall not apply to a factory during the noon hour, or to any special pipes in said factories which are carried around to soak tubs, or to any part of said ordinance relating to the use of water meters, or to blocking machines during the months of May, June, July, August and September. No portion of this ordinance shall be construed as applying to pipes maintained for automatic sprinklers."

STREET LIGHTING AND POWER

City Takes Option on Power Site.

Tacoma, Wash.—On recommendation of commissioner Gronen and the city engineer, the council has voted to take an option on Lake Cushman for the purpose of obtaining a power site to add to the present supply of power which is expected to reach its limit by October, 1919. The site is owned by the Mason County Power company, which asks \$400,000 for it. The council has voted money for a survey of an additional power site to the Nisqually plant at Mineral. A crew of surveyors and electrical engineers will be sent to Lake Cushman to make a thoro survey and report as soon as possible. Gronen produced a mass of charts and maps to show that the present Nisqually plant's load was increasing at the rate of 10 per cent a year. At the present rate of increase the city plant would be forced to drop some of its larger customers to supply its home consumers. The Mineral lake site will allow the Nisqually plant to operate at full capacity of 24,000 kilowatt the whole year. The Milwaukee railroad has asked for 8,000 kilowatts of power by September and the American Nitrogen Products company at LaGrande has increased its plant and wants 3,000 kilowatts at the same time. The new city car line will use 500 kilowatts. At present the city plant is supplying 12,000 kilowatts daily to the T. R. & P. company and is running at full capacity. The Lake Cushman site will cost \$400,000 and if developed to its estimated capacity of 46,000 kilowatts would cost \$2,500,000. The power house would be on the shore of Hoods canal near the town of Hoodsport. A transmission line 45 miles long would bring the power to Tacoma.

Utilities Must Follow Commission's Prescribed Accounts.

New York, N. Y.—The system of bookkeeping prescribed by the Public Service Commission must be followed by all of the public utility corporations to the end that the auditing of these accounts by the commission may be quickly performed with very small danger of mistakes. This was the effect of a decision given by the appellate division of the Supreme Court in a certiorari proceeding brought by the Kings County Lighting Company to review a decision of the commission in reference to an issue of bonds. William L. Ransom, chief counsel for the commission, said that the decision would make for sound financing and the proper upkeep of the properties of the corporations. The legal proceedings grew out of the determination of the commission to attach as a condition to an authority given to the Kings County company to issue \$134,545.53 in bonds that the money should be used only to make good the indisputable depreciation of the company's property. In sustaining this order the court held that Section 66 of the public service commissions law authorized the commission to prescribe uniform methods of keeping accounts by the gas corporations. The company vigorously objected to the commission dictating the manner in which it should keep track of its own affairs. Another question of importance, which has resulted in much controversy, was answered in the commission's favor. The Kings County and other companies had successfully urged upon the commission that it had no power to deal with the subject of depreciation in a separate proceeding and to require compliance with an order by the commission concerning maintenance expenditures and depreciation reserves. The commission had yielded in this matter because there appeared to be grave doubts of its power to deal with the matter in an independent proceeding, and

had undertaken to deal with it as a Kings County company matter through attaching a condition to an order authorizing an issue of bonds. Concerning this matter the opinion of the court read: "In no event could the commission, without taking an independent proceeding against the relator, in which the relator would have notice and an opportunity to defend itself, make an order requiring it to change its whole system of accounting and put its depreciation charge upon some other basis than that adopted by the company under the law and the earlier order of the commission." Under the commission's order requiring the maintaining of its system of accounts it is required that when fixed capital is retired from service, depreciation applicable to the period after Dec. 31, 1908, was to be charged to the depreciation reserve, and that until otherwise offered the amount estimated to be necessary to cover such depreciation, month by month, was to be based on a rule to be fixed by the commission. The company had set aside an eight-cent rate for each thousand feet of gas sold, to provide for depreciation, and later increased the amount to 11½ cents. It was claimed that part of this reserve had been used for extensions. As to this method, the court said that such a proceeding "would be tantamount to permitting the relator to borrow money for the purpose of providing for a depreciation fund, a practice unsound in principle, and one which would ultimately lead a company into a serious financial condition. The commission therefore was naturally willing only to permit the treasury to be reimbursed by an issue of bonds on condition that such part of the proceeds as were equivalent to the sum spent out of depreciation reserve should be restored, and it coupled its permission with such a condition." The court also decided that the company was entitled to fix such a rule or rate for depreciation as it saw fit, and that this rule was to govern until the commission fixed a different rule or rate, as the commission had the power to do.

To Purchase Gas and Electric Plants.

Oroville, Cal.—The city of Oroville has filed an application with the railroad commission asking the commission to fix and determine the just compensation to be paid the Pacific Gas and Electric Corporation for their gas and electric plants and distributing systems located in Oroville, and an addition known as Oro Vista. The application says that the Pacific Gas and Electric Company claims an interest in the properties formerly, or now, owned by the Oro Electric Corporation, but that it does not know the nature and extent of such interest. The city proposes to purchase the plants at a reasonable value rather than construct a competing system.

Money Refunded on Fast Meters.

Charleston, W. Va.—For what is said to be the first time in the history of West Virginia, gas consumers are being refunded money because gas meters have registered more than they should, according to an announcement made by the public service commission. Out of the 29,000 meters in the state placed in service by chief inspector A. D. Shepherd and his deputies last year, there were 2,916 meters that were more than 2 per cent fast. The amount refunded on these meters by the companies furnishing the gas is announced at \$794.43.

FIRE AND POLICE

New York Fire Department Does Well.

New York, N. Y.—According to the annual report of fire commissioner Adamson, the efficiency of the department has increased during the year, and although the fire record of 1916 as a whole was less encouraging than in 1915, when the loss was unusually low, the higher losses were due to the great increase in buildings because of the general prosperity, the storage of munitions, and the growth of the chemical industry. In tenement houses, in which 4,000,000 of the population of the greater city dwell, there were 744 fewer fires than in 1915, a decrease of 40 per cent. Factory fires were 159 fewer, and theatre fires were

reduced one-half. The increase was in ship fires, munition plants, on piers where munitions were stored, and in chemical plants. To meet the emergency caused by the new dangers, commissioner Adamson organized an auxiliary fleet of fireboats, 143 in number, with terminals in strategic points. The total fire loss in New York in 1916 was \$8,716,404, while the average loss for the preceding three years, notwithstanding the record of 1915, which was the lowest since the present fire department was organized, was \$9,669,461, or nearly a million more than last year's loss. There has been a gratifying development in the employment of preventive measures, and the commissioner in his latest report gives due credit to the uniformed force for its capable co-operation with the regular fire prevention staff. More than 300 firemen have made daily building inspections since 1914. Last year firemen made 1,476,951 inspections; 18,752 orders were issued by the bureau, and 16,531 were complied with. Of the 141 lives lost nearly all were lost in fires due to carelessness. The commissioner says that in no single case was the loss of life due to the construction or design of the building. Because the law does not require fire escapes on private dwellings, thirty-three lives were lost. The largest single cause of fire in 1916 was the careless use of cigars, cigarettes and pipes. The new fire alarm system is already nearly completed, and the commissioner expects that it will still further increase the efficiency of the fire department. The fire department now uses comparatively few horses—it will soon be five-sixths motorized. No fewer than 1,598 members of the force attended the course of practical and theoretical instruction in the fire college. The uniformed force during the year numbered 5,059.

City Awarded Compensation for Electrocuted Fireman.

Shreveport, La.—Through a judgment rendered in the district court by judge Land, based on a point of law sustained by the supreme court in a previous hearing, the city of Shreveport, as subrogee, is awarded a claim of \$10,000 against the Southwestern Gas and Electric Company for the death of Clayton Hilburn, a fireman. An appeal was again taken. If the lower court is sustained, Mrs. Willie Hilburn, the fireman's widow, will receive the balance of the judgment after the amount paid her by the city under the compensation law and the expenses of the litigation have been deducted. In February, 1915, Clayton Hilburn, a fireman, was electrocuted while on duty at a fire. Mrs. Hilburn had the choice of alternatives; she could either accept the compensation due her by the city under the employer's liability act or she could file suit against the Southwestern Gas and Electric Company. She chose the former, receiving \$2,100 and subrogated her rights of action against the company to the city, which then filed suit to recover \$15,000 damages. The question immediately resolved itself into her right to subrogate her claims for damages in a personal injury suit to the city and the district court ruled that she could not. Her attorneys appealed to the supreme court from this decision, the higher court sustained his plea and ordered a new trial.

Lack of Fire Prevention Methods Criticized.

Salem, Ore.—Severe criticisms of Salem's council, fire department, schools, water supply and business institutions are contained in a fire survey report submitted to mayor Keyes by insurance commissioner Wells in the capacity of state fire marshal. "Apparently the outflow is greater than the amount that can be supplied, and this has caused the supply in the reservoir to be depleted to an extent we consider serious from a fire standpoint," says the report in condemning the water supply, and in recommending that a fire reservoir be built, and rigid rules be adopted for lawn sprinkling. The present water supply, the report declares, would not last over six hours in case of a fire. The reservoir for fire purposes should have a capacity of 1,000,000 gallons, it is stated. Referring to the fire department, the report declares: "We find a condition existing here that we do not believe is found in any other city in the United States of its size. The longest ladder in the Salem fire department is 25 feet in length. The fire department would be unable to rescue a person from a third story." Further,

it is asserted that when the department responds to fire calls in the residence district the business district is absolutely without protection. After flaying the council for not having enforced an ordinance requiring the city engineer to regulate electric wiring, the report excoriates the school board for lack of fire drills in the schools, and for having shut off the water supply to the school buildings in order to have water rent. "Conditions exist in some business houses which, if not immediately remedied, will result in the destruction of their property, and no doubt cause loss to others who could ill afford the loss," says the report. "In several places the sanitary conditions were unbelievable. The people who conduct their business under such conditions are a detriment to any community, and we hope that our little advice to them will be the means of eliminating the fire hazard and improving the sanitary conditions. In two cases, however, we fear we will have to apply the law with its fine of not more than \$50 a day." Commenting on the disposition of the business men, the report declares that some were found "who were against everything," and that "one man was even angry because business was good."

GOVERNMENT AND FINANCE

City Manager Plan Center of Dayton Primaries.

Dayton, O.—An interesting primary election has been held here which drew widespread attention from all over the country because the city manager plan was involved. The present commissioners ran for re-nomination on a non-partisan ticket. While declaring themselves in favor of the non-partisan principle and the manager plan, the Democrats put up their own ticket. They were charged with desire to gain control of the city administration for political purposes. The Socialists ran a complete ticket, and there were four independents. Six were to be elected. The election resulted in the nomination of the three Socialists and the present incumbents, the Socialists getting the highest vote. Willard Barringer, Socialist, received 11,017 votes, while the highest non-partisan, commissioner Jesse M. Switzer, polled 7,314 and George P. Huffman, Democrat, polled 3,883. The average non-partisan vote was 6,849, the average Democratic vote was 3,355 and the average Socialist vote was 9,721.

Millions Added to Tax Valuations.

Indianapolis, Ind.—Total increases of \$10,963,461 in corporation values for taxation in Marion, Lake, Lawrence and St. Joseph counties were made by the state board of tax commissioners as the result of appeals taken from the amounts fixed by the county boards of review. The decisions of the state board are victories in particular for Leo Fesler, Marion county auditor, who appealed from the Marion county board of review in regard to the valuation of the public service corporations on the ground that the amounts fixed were inequitable and too low, and for citizens of East Chicago, who asked the state board for more equitable valuations on large private corporations there. Last year, after county auditor Fesler had made an appeal to the state board in regard to the valuation of \$4,011,500 on the property of the Indianapolis Water Company by the county board of review, the state board raised the total valuation to \$5,786,383. The valuation this year is an increase of \$105,071 over the amount fixed last year. The state board also approved a horizontal increase of from 3 to 10 per cent on the personal property valuations in certain counties. This increase amounted to 3 per cent in Union county; 5 per cent in Adams, Jasper, Montgomery, Perry, Pulaski, Scott, Starke, Sullivan and Warren counties, and 10 per cent in Vermillion county. Whitley county received a horizontal reduction of 10 per cent. The total increase in Marion county fixed by the state board in advance of the amounts fixed by the county board of review is \$4,164,942. The increases in East Chicago amount to \$3,781,595; in Gary, where the valuation of the Indiana Steel Company was made the same as last year, \$1,029,200; in St. Joseph county, \$1,911,485, and Lawrence county, where there are valuable creosoting plants, \$76,239. The total amount of corporation valuations made by county boards of review and the state board is greatly in excess of the

total of last year. In some instances the state board made further raises in the estimates after the county boards of review had made increases over last year. The total horizontal increase in the state, due to the board's arbitrarily adding percentages of increase to each of eleven counties, amounted to \$1,854,536. One county, Whitley, was reduced 10 per cent in its total valuation and this resulted in a decrease of \$526,145. Thus the net increase by reason of the board's horizontal increases and decreases in the state amounted to \$1,328,391. The board's instructions resulted in the general average valuation of personal property for taxation purposes being 75 per cent of "true cash value" throughout the state, according to its announcement. In the final recapitulation of its figures the board showed that the total valuation for taxation purposes of all personal property in the state amounted to approximately \$541,475,074, or a gain of about \$45,076,169 over last year. The board's increases in valuations of corporate property totaled \$10,963,461, and the board's net increase for this year on the classes of corporate inter-county property valued originally by the board brings up the total increase in personal property and additional improvements to property which came before the state board on appeals and the corporate property valued originally by the board at its first session to approximately \$58,878,857. This is the total increase of valuations for tax purposes made by township assessors, county boards of review and the state board of tax commissioners. It does not include, of course, the values of additional improvements to property in those counties, from which appeals were not sent in to the state board and it does not include the increase in values of real estate. Real estate is not valued this year for taxation purposes, the values being placed on that class of property once in four years, under the Indiana statutes. The board made public also a comparative statement of the average valuation of horses, cattle, hogs, sheep, automobiles, farm implements and household goods, made in each county of the state, the figures being given for this year and last year. They follow:

Class of property.	Valued 1917.	Valued 1916.
Horses and mules.....	\$73.50 a head	\$70.10 a head
Cattle	30.50 a head	27.40 a head
Hogs (all sizes).....	8.80 a head	6.10 a head
Sheep	6.50 a head	4.50 a head
Automobiles	205.90 each	211.50 each
Farm implements (per farm).....	45.70	41.40
Household goods (per home).....	41.90	39.20

The board also announced that its tabulations show that the general average valuation in all counties of money and bonds, notes and mortgages, banks and trust companies, and merchandise, was 75 per cent of "true cash value."

Vote for City Manager Plan.

Petersburg, Va.—This city has decided for the city manager plan of government. The vote at a special election six people in Petersburg, therefore, condemned the old, confused, indirect mayor and bicameral council system, which they considered old and confused.

Municipal Woman Suffrage in Columbus.

Columbus, O.—Municipal suffrage carried here by a majority of 935 votes. The total vote was 8,637 for suffrage and 7,702 against. Women of Columbus will be allowed the right to vote at the next November election. East Cleveland is the only other city in Ohio granting the right to vote to women on municipal issues. Voters at the election also approved a \$50,000 bond issue for paving Columbus streets.

City Manager Plan Defeated.

Bridgeport, Conn.—Displaying slight interest, but with a decided opposition, 4,470 voters out of the city's registration of 21,687, defeated the proposed city manager charter, which it is believed will be received as a final repulse for any propositions pertaining to a change in the city's government. It was beaten more than three to one. Of the handful voting, 931 indicated that they favored the charter, while 2,898 voted "no" and 650 entered the polls, but failed to signify their choices, their votes being wasted. The defeat of the proposal is ascribed to the small vote, the indifference of the voters and the determination of the opposition.

Many who declared themselves in favor of the city manager principle picked flaws in the proposed charter. At a previous election the commission form of government was defeated by lack of a sufficient vote. This time the plan received the endorsement of mayor Clifford B. Wilson. The initiative, referendum and recall were in this charter.

STREET CLEANING AND REFUSE DISPOSAL

Conservation Results in Garbage Collection Drop.

Bridgeport, Conn.—The conservation movement has had an appreciable effect on the collection of garbage in this city, according to a recent statement by health officer Walter H. Brown. During the month of June 3,114,600 pounds of garbage were collected. This is 114,490 pounds less than the total amount taken in June, 1916, when the city collectors gathered 3,229,090 pounds of refuse. It is thought that the urgings of the Fairfield County Association for the Mobilization of Resources relative to careful separation of garbage has been the principal factor in bringing down the total. In addition nearly 40 per cent of the refuse collected during the last month has been foreign matter such as rags, bottles, tin cans, crockery and fruit baskets. This amount, subtracted from the whole would show a large difference in the amounts collected in June this year and June a year ago. The health officers are busily engaged in warning against the practice of throwing such things as bottles, crockery and tin cans in the garbage. There is a city ordinance providing a heavy penalty for those who violate this ruling. One of the huge digestors at the garbage plant was recently rendered useless because of rubbish. One of the health department inspectors accompanied the garbage wagon about the city noting the neighborhood and houses that are most flagrant in their breach of the city ordinance.

Will Not Get Alcohol From Garbage.

Columbus, O.—Because of the uncertainty of prices for alcohol after the war, council recently decided not to invest \$35,000 in a plant to render alcohol from garbage, as already described in Municipal Journal. Charles P. Hoover, chemist at the filtration plant, and Thomas D. Banks, superintendent of the garbage reduction plant, after testing the process of Dr. Morgan of Chicago, for more than a year, reported that a good profit could be made from the product at present war prices, but at normal prices paid for alcohol, the profit would be slight. There are to be no further experiments along these lines.

Improve Specifications for Refuse Collection.

Indianapolis, Ind.—Extensive changes in the method of disposing of refuse of every sort in Indianapolis are contained in specifications adopted by the Board of Public Works. The specifications, prepared by B. J. T. Jeup, city engineer, provide for the hauling and disposal of all garbage, ashes and household refuse for a period of five years dating from January 1, 1918. The board will receive bids September 5, and the contract would become effective next year in May, when the present contract with the Indianapolis Reduction Company for garbage disposal expires, and in October of next year when the contract for the hauling of ashes and paper held by the Indianapolis Hauling Company expires. Garbage, dead animals, ashes and household sweepings are disposed of at the present time under two contracts. The specifications just adopted provide that all this waste material would be hauled to Seller's farm under one contract. The Indianapolis sanitary commission, which was created by an act passed by the last general assembly, will have control of the disposal of garbage and ashes, but the department of public works, under the provisions of that act, will have charge of the hauling of the waste products of Seller's farm, where the commission intends to erect a reduction plant and an incinerator to dispose of all refuse from private property. Mr. Jeup said each bidder would be required to submit bids providing several methods for paying for the hauling of waste products, and he said the proposition that would prove the most advantageous to the city would be accepted.

One bid will be an offer of a lump sum for hauling the debris to Seller's farm. Another bid would provide for the naming of a sum per acre of annexed territory for the hauling of debris. Another bid would be based on the net tonnage of material hauled. Bidders will be required to submit proposals for hauling the debris for a five-year period dating from January 1, 1919, and also for hauling the debris during periods of 1918 until January 1, 1919, after the present contracts expire. The board of public works reserves the right under the terms of the specifications to require each bidder to make known the names of the men interested in the bidding company in order that the board may determine whether or not the bidders are trustworthy. The city council would be required to ratify the contract. The contractor would be required to give bond in the sum of \$50,000 to guarantee the fulfillment of his contract and would be required to have an office near the city hall and to call at the office of the Board of Public Works daily to receive instructions or complaints about service. Mr. Jeup expressed the belief that if a contract is signed based on the specifications that have been prepared, ample facilities will be provided for hauling away all waste products from the homes, apartment houses, hotels, commission houses, school buildings and business places of the city. The contract of the Indianapolis Hauling Company, which now is in force, limits the classes of waste products that are to be hauled to tin cans, waste paper and household sweepings. The word "sweepings" in the new specifications embodies the following: Sweepings, paper, cans, bottles, wall paper, fabrics, shoes, discarded tinware, iron, sheet metal, grass, weeds, leaves, tree trimmings, dead trees, brush, vines, flowers, wornout furniture, excelsior, dead animals and ashes. The specifications do not include street sweepings. Mr. Jeup said as many types of waste products have been included in the specifications as possible, in order that householders would not be required to hire teamsters to carry away debris from their premises. The promiscuous hauling of such debris has resulted in promiscuous dumping in many parts of the city, and Mr. Jeup hopes that the next contract will eliminate these difficulties.

New Crematory in Service.

Spokane, Wash.—The city's new crematory, under construction for some time, is now in operation. Superintendent Arthur Peterson is in charge. The new plant is said to represent the last word in crematory construction and is equipped with garages, stables and machine and blacksmith shops of brick and concrete fireproof construction. The tallest concrete stack in the city, 207 feet high, is part of the plant. Parking of the grounds, originally planned for this year, will be postponed until the spring of 1918, because of the lateness of the season.

Big Garbage Plant Completed.

New York, N. Y.—The new \$2,500,000 garbage disposal plant of the Metropolitan By-Products Company, on Arthur Kills, Staten Island, is now completed and has been visited by many operators from all over the country wishing to see the practical demonstration of the quick and odorless process employed there. All the plants, with the exception of one at New Bedford, Mass., represented by the visitors, use the old type system similar to that of Barren Island, which requires seventeen different operations to accomplish what it is claimed the new system will do in three—these being closed-in and automatic. The Staten Island plant has a capacity for the reduction of 2,000 tons of garbage a day and is the largest garbage reduction plant in the world. The testing-out process of the machinery had proceeded to about 70 per cent and many units were in complete operation when the visitors arrived. Irwin T. Osborne, a garbage expert formerly employed by the city, explained the technical features of the new system. Raymond Wells, the inventor of the system known as the "Cobwell process," was also present. The party was conducted by F. D. Clark of the American Reduction Company of Pittsburgh, Pa., in company with ex-Senator Flinn of Pittsburgh. The new building is constructed of steel, stone, concrete and glass and is designed for absolutely sanitary operation. It is claimed that with its simple and perfected system it is phy-

sically impossible for objectionable odors to escape and pollute the atmosphere. The plant will give employment to hundreds of Staten Islanders on a payroll of \$6,000 a week, or \$300,000 a year, and disburse upward of \$1,000,000 a year locally for supplies. A large dormitory and office building have been constructed by the company near the plant, the one to accommodate the clerical force, timekeepers and foremen, and the other to supply offices and sleeping quarters for the engineers and official staff. Both these buildings are equipped and furnished in modern style. The housing of the families of the main laboring force—totaling possibly from 1,200 to 1,500 persons—will be provided for by an independent operation under conditions prescribed by the Metropolitan By-Products Company so as to insure for its employees wholesome, sanitary living conditions. This operation will be conducted by the Weymar Lumber Company, which purchased forty acres of its land in a wooded tract several hundred yards east of the garbage plant on which to establish a labor colony drawing its patronage from the garbage plant and other factories in the vicinity.

Garbage Plant Turned Over to Soap Company.

Akron, O.—Inability to increase the efficiency of the garbage collection is said by supervisor of garbage collection D. R. Thomas to have been the cause of the resignation of Geo. A. Reynolds, manager of the garbage collection. Reynolds says the job of getting help was more than he could handle in Akron. He had been given free hand in the entire collection, but was unable to keep up with the demands on account of the lack of help. Ever since the plant was turned over recently to the Akron Soap Co., and D. R. Thomas was made supervisor of the collection, he says he has been in a position to insist on a 48-hour collection of garbage on complaints. Reynolds, he charges, has been unable to comply. A forfeit of a bond of \$15,000 would fall if the soap company did not collect the garbage satisfactorily, according to the terms of the contract. Thomas promises that the teams will soon be routed so as to determine just where they should collect any one day. Next year, he says, when the railway loading station is finished and the long haul to the plant is eliminated, the collection will be twice weekly. The garbage situation in Akron has been a source of difficulty to citizens and city officials for some months, garbage remaining uncollected for several days during hot weather. The long haul of several miles to the garbage plant has caused much trouble. When Thomas was appointed supervisor, \$21,000 was appropriated to pay for collection and \$1,520 for personal services.

City Takes Over Garbage Collection.

Canton, O.—Superintendent Krumlauf is gradually getting the garbage collection situation under control and by working overtime has about caught up with the needs of the city. The officials were greatly handicapped when the city took over the collection system of the Sanitary Garbage company a few weeks ago. Collections were then three weeks behind, the company officials did not co-operate with the city and most of the collectors quit work. Superintendent Krumlauf has therefore had to build up a new organization and establish a new system. Following repeated failure by the collection company to fulfil its contract and innumerable complaints of bad service, the city decided to take over the collection system. The city retained R. Winthrop Pratt, of Cleveland, as consulting engineer to investigate and he reported that equipment necessary for the city to give adequate collection service would cost \$17,500 and hauling would amount to \$16,500 a year. With free collection it was estimated that the amount of garbage collected would total 19½ tons per day in winter and 37 tons in summer. After bickering, the council passed an ordinance without the approval of mayor Stolberg, paying the collection company \$1,760 for wagons and tanks, and authorizing service director Starrett to secure additional equipment. Henry Krumlauf, superintendent of sewers and the sewage disposal plant, was appointed superintendent of collection at a salary of \$1,500. A new reduction plant was completed by the Canton Fertilizer and Chemical company northeast of

the city, and the city is hauling the garbage to the new works. The old disposal plant will be in operation one day each week for the burning of rubbish and papers. The contract between the city and fertilizer plant does not allow the delivery of anything but reducible garbage to the plant. A straight rate of 40 cents per month, payable in advance, is being charged by the city for the collection of garbage from residences. Any person not paying promptly will not be given service, it is stated. The hotels and restaurants will have to furnish their own cans and will be charged at a rate of six cents per can. The citizens will have to furnish their own cans later when the city installs the tank wagon collection. Free collection of the garbage is planned to be started about January 1. The present profits will be used to buy additional wagons and cans.

TRAFFIC AND TRANSPORTATION

Utility Board Upheld in Fare Decision.

Trenton, N. J.—An order of the Board of Public Utility Commissioners restraining the Trenton & Mercer County Traction Corporation from putting into effect the proposed withdrawal of the sale of six tickets for a quarter on its lines in this city and suburban sections has been affirmed by the supreme court in an opinion handed down by Justice Swayze. In deciding the appeal of the traction company the court held it was clear that the utilities commission had jurisdiction under the section of the act involving supposed increase in rates. The court found it unnecessary to pass upon the question whether the original ordinances of the city of Trenton and their acceptance amounted to a contract by which the company was forbidden to charge more than five cents. It was also unnecessary, in the view of the court, to consider whether a fare of four and one-sixth cents is reasonable in view of the present condition and the situation of the company.

Tunnel Contractor Sues, Charges Misinformation.

Boston, Mass.—Because of the character of the soil encountered in digging the tunnel under Fort Point channel the contractor, Patrick McGovern & Co., has brought suit in the Supreme Court for extra pay from the city of about \$250,000. The contention is made by the contractors that the transit commission concealed information in its possession by indicating in the plans that what proved to be rock was only hardpan. Consequently the contractor based his proposal on the presumption that it was hardpan, whereas he would have placed a higher figure on the work if he had known that it was rock. An offer is made to return to the city the \$2,250,000 already paid in order that the contract terms may be revised and the contractor be paid on the basis of what he has done. It is denied by the city that the transit commission concealed any information, and that the information given by the commission was anything more than an expression of opinion. Moreover, the city contends that it cannot be held liable for the action of the commission, as the supreme court has decided that the commissioners are public officers and not servants of the city.

The New York Traffic Court.

New York, N. Y.—Magistrate Frederick B. House of the traffic court has given out a report on the work in his court from its opening on June 14, 1916, to Dec. 29, 1916. The report contends that pedestrians have a right to demand the regulation of traffic because the lives of 3,500,000 persons are put in peril by reckless driving and speeding through the city streets, while only 350,000 use automobiles daily. Successful use of the summons is emphasized. Of 7,365 defendants only 32 were placed under summary arrest. There were 6,451 pleas of guilty, and 885 pleas of not guilty, while only 29 failed to appear for examination and have never been apprehended. A total of \$103,609 was collected in fines, and 779 persons were sent to prison, but 485 of this number eventually paid their fines. Only 117 were sent to prison without the alternative of a fine. The total number of speed cases was 2,746. Of these 22 were second offenders and 23 had been brought into court before. The licenses of 11 of the third offenders were revoked, and 12 paid fines of \$100. Most of the speed violations were on Fifth avenue and Riverside drive.

High Street Car Record Despite War.

Liverpool, England.—The report of the Liverpool Tramways for the past year is especially interesting. The striking features are that 13,500,000 more passengers were carried in 1916 than in the previous record year, which was the year before the war, and that even with the enormous traffic handled, not one serious accident occurred. This successful operation of the tramway system was conducted by a staff which, to a large extent, was new to the work; that is, by men incapable of military service, and, very largely, by women. In the industrial portions of Liverpool the cost of travel was 2 cents per 3 miles and 207 yards at all periods of the day, against an average for the 72 municipal tramways of the Kingdom of 2 cents per 1 mile and 685 yards. Even with concessions in some towns to workmen for a limited number of hours, the fares in many cases were not as low as those given to the whole community of Liverpool. The increase in the traffic receipts during the year was \$201,609. The average earnings per car-mile were \$0.2824 against \$0.2670 for 1915.

MISCELLANEOUS

Billboard Regulation in Los Angeles.

Los Angeles, Cal.—The city council has passed a measure regulating billboards in the city. The chief provisions of the legislation are as follows: 1. The existing billboard ordinance affecting the height, construction, etc., of billboards was re-enacted. 2. A central business district is established within which no other restrictions than those contained in the present ordinance are enforced. 3. A semi-business district defined as any block wherein more than 50% of the occupied frontage is occupied by buildings utilized for business purposes, is established, within which no billboard larger than 12 square feet (for instance 3 x 4 feet) is permitted except upon the written consent of 51% of the property frontage in such block. Furthermore, no billboard more than 12 square feet, without such consent, can be established within 15 feet of another billboard. 4. A suburban district is established, defined as "all portions of the city which are not divided or subdivided into lots of 100 feet or less frontage on any public thoroughfare" within which there is no new restriction upon billboards, except that they must be at least 50 feet from any residence building. 5. The residence district established by the ordinance is defined as all portions of the city not included within the business, semi-business or suburban district, and in this district no billboards greater than 12 square feet are permitted with or without the consent of the property owners. 6. As to the establishment of new billboards the provisions of the ordinance take effect immediately, but with respect to existing billboards 12 months from the date of passage of the ordinance is given, during which time adjustment may be made. 7. No billboard in any section of the city may be installed or maintained within 50 feet of any building used exclusively for residence purposes.

Municipal Auditorium Opened.

Portland, Ore.—Portland's \$600,000 public auditorium, which has been formally dedicated with appropriate exercises, covers an entire block of ground. It is a massive structure of steel construction, classic in design and with fine outlines and color scheme. It was designed to fill a long felt want and it will be utilized for many civic functions from a small gathering in one of the lesser assembly halls to a great mechanics' fair, an immense operatic production, a music festival or a national convention. It is of the opera house type of building, the main auditorium being constructed as a great theater with a seating capacity of 3,527. There is a stage, 45 feet wide and 82 feet long, perhaps the largest stage on the Pacific Coast. It is equipped with all modern accessories, including 16 dressing rooms, property rooms, a big male chorus dressing room and a rehearsal room. On each side of the main floor there are assembly halls for chamber concerts or small gatherings, 40 feet wide and 137 feet long, which can be thrown open by removable partitions into the main auditorium, increasing the seating capacity of the auditorium.

to a maximum capacity of 5,500. There are no columns in the way to obstruct a view of the stage at any point.

As accessories to the auditorium there are men's and women's dressing rooms, cloak rooms, smoking rooms, reception halls and offices for the manager. The foyer is roomy. Cushioned opera chairs are on the main floor and hard-seated opera chairs are in the balcony and upper galleries. The chairs on the lower floor are so designed that they are easily removed to make place for the flat removable floor which has been constructed at a cost of \$26,000. This floor can be placed at an expense of \$700 at any time when it is desired to use the main auditorium for balls or manufacturers' fairs or any other such purpose. This floor runs on a level with the stage. One of the biggest features of the auditorium is the great pipe organ being installed at a cost of \$25,000. In connection with the small assembly hall on the south side of the building there is a large kitchen and accessory attachments from which banquets may be served.

On the second and third floors on the south side there are a succession of rooms which will be occupied by the Oregon Historical Society. These rooms are especially arranged for the museum and the historical library of this organization. In connection with it are reception rooms and offices for the officers of the society. On the north side of the building there is another immense room on the second floor which can be used for art exhibits or for the city free museum. Another exhibit room may be utilized for art exhibits. In the basement on the north side are located public comfort stations and shower baths for men and women. They will be open constantly for the benefit of the public. There is also in the basement an immense exhibit room, 114 feet wide and 168 feet long, for automobile shows, land product or manufacturers' shows. There are quarters for janitors and rooms for the storage of equipment and supplies. One of the most modern heating systems in any building in the city supplies the structure with heat and ventilation.

Need for this building was seen after the Lewis and Clark exposition. Portland had no building suitable for housing conventions or big operatic productions or music festivals. After much planning, a charter amendment was submitted to the voters in 1911, providing for a bond issue of \$600,000 for the construction of an auditorium, and this amendment was carried by a substantial majority. Fifteen days after the bond issue carried the auditorium commission, consisting of T. B. Wilcox, W. D. Fenton, Hugh Hume, Dr. J. R. Weatherbee and Phil Metschan, Jr., was appointed by Mayor Joseph Simon. Ellis F. Lawrence was named advisory architect for the commission and he prepared a tentative program. The auditorium bill provided that plans should be in accordance with the rules of the American Institute of Architects, and accordingly Willis Polk, of San Francisco; Kirk K. Cutter, of Spokane, and Ellis F. Lawrence were named a committee of awards. Plans were then submitted and those of J. H. Freedlander and A. D. Seymour, of New York, were accepted. These plans provided for a building larger than could be placed on one block and the auditorium commission then proposed an additional bond issue of \$250,000 to purchase land adjacent to the Market block or some other site. This bond issue was rejected by the voters and the commission had on its hands plans for a building larger than could be erected on the market block, and with no funds to purchase additional ground. The matter was then held in abeyance until the commission form of government went into effect. Mayor Albee assigned the task of unraveling the tangle to commissioner William L. Brewster, and after much investigation and agitation, it finally was decided to place the building on the Market block. In the meantime the question arose as to the right of the city to use the Market block for an auditorium, as the land originally was deeded to the city for public market purposes. A suit was brought and the state supreme court finally decided that the right of the city to utilize the Market block for any purpose it desires was supreme. Architects Freedlander and Seymour were ordered to prepare revised plans for the building on the Market block. The contract for the structure was awarded to Hans Pedersen in February, 1916, and soon afterward the breaking of the ground for the building took place. Trouble with the contractor followed, but the work proceeded to such a stage that the cornerstone was laid in September, 1916. There is still much work to be done on the structure before it is finally accepted by the city. It will not be fully completed for a month, but while the work is progressing it can be utilized for many public functions.

Building Municipal Coal Docks.

St. Paul, Minn.—Work on St. Paul's new municipal coal docks on the upper levee is well under way. It is the plan of the engineering department to speed the job, so there

LEGAL NOTES

A Summary and Notes of Recent Decisions— Rulings of Interest to Municipalities

Owner of Lot—Fee in Street.

(N. D.) In this state an abutting lot owner owns the fee to one-half of the street.—*Gram Const. Co. v. Minneapolis, St. P. & S. S. M. Ry. Co.*, 161 N. W., 732.

Breach of Contractor's Agreement.

(Or.) Where contractor for street improvements undertook to make all payments to laborers or materialmen, his failure to pay for materials held breach of conditions of contract and bond, for which contractor's sureties were liable.—*Bay City v. Sandberg*, 163 P. 444.

Unjust Assessment.

(Ill.) Where the court, on objection that assessment for sewer construction was inequitable, found it to be so, it could not dismiss petition for such inequitable apportionment between the public and property owners, but it should have changed the assessment.—*Village of Bradley v. New York Cent. R. Co.*, 115 N. E. 640.

Surety on Bond—Liability.

(U. S. C. C. A.) A surety on the bond given by a paving contractor cannot, if the contract was invalid because in excess of the mayor's authority, be held liable for the contractor's failure to conform to the specifications.—*City of Hutchinson v. Kansas Bitulithic Co.*, 239 F. 659.

Sewer Contract—Estimates.

(Mich.) A sewer construction contract provision that all estimates should be made by city engineer and should be final and conclusive between the parties was valid.—*Schneider v. City of Ann Arbor*, 162 N. W. 110.

Sidewalks—Construction and Assessment.

(Iowa) Where city ordered construction of sidewalks, and assessed cost for sidewalk abutting a quarter section, which had been platted into city lots, against the quarter section and not the several lots which were owned by various persons, the assessment could not be canceled as to one lot owner and sustained as to another, where both were equally liable.—*Cavanagh v. City of Des Moines*, 162 N. W. 17.

may be no unnecessary delay in putting the unloading apparatus in action. The government must do some dredging before the new unloading platform will be available. Meanwhile officials of the city, the companies concerned and the St. Paul Association have confirmed plans for establishing ore docks on the bridge of the St. Paul Bridge Terminal company, a project which will result in hundreds of tons of ore from the Minnesota range districts being shipped from St. Paul to St. Louis by boat on the Mississippi river. The plans have been approved by the city council and appropriation made to carry out the work. They form one of the biggest recent steps toward reviving river traffic. According to the plans, chutes will be constructed from the floor of the draw span, adjoining the center pier of the bridge. Cars of ore will be dumped into boats from the chutes. A large percentage of the ore will be shipped to St. Paul by rail, taken to the ore docks at the terminal bridge between here and South St. Paul, loaded into the boats and shipped to St. Louis and other ports down the river. L. P. Wolff, engineer, and J. W. Pearson, secretary of the South St. Paul Union Stockyards company, representing the bridge corporation; assistant city engineer Gutbac, H. E. Stevens, bridge engineer of the Great Northern railway, and E. B. Norris, industrial commissioner of public affairs of the St. Paul Association took part in the agreement. The bridge was given for the purpose by the terminal company officials in an effort to aid the city in reviving river traffic, with no remuneration. According to the plans, the city will have to pay for installing the chutes and other necessary improvements, which, in the opinion of the engineers, will amount to little.

NEWS OF THE SOCIETIES

Calendar of Meetings.

Aug. 21-23.—NEW YORK STATE FIREMEN'S CONVENTION. Flushing, N. Y. Secretary, Thos. Honohan, Frankfort, N. Y.

Aug. 27-29.—UNION OF CANADIAN MUNICIPALITIES. Annual convention, London, Ont. Secretary, W. D. Lighthall, K.C., Westmount, Que.

Aug. 28-30.—PENNSYLVANIA LEAGUE OF THIRD CLASS CITIES. Annual convention, Harrisburg, Pa.

Aug. 29-31.—UNION OF NOVA SCOTIA MUNICIPALITIES. Annual convention, Truro, N. S. Secretary, Arthur Roberts, Bridgewater, N. S.

Aug. 29-31.—ONTARIO MUNICIPAL ASSOCIATION. Annual convention, Toronto, Ont. Secretary, B. H. Spence, 705 Lumsden building, Toronto, Ont.

Sept. 10-12.—AMERICAN CHEMICAL SOCIETY. Fifty-fifth annual convention, Boston, Mass.

Sept. 10-15.—NATIONAL EXPOSITION OF SAFETY AND SANITATION. Annual conference, New York, N. Y. Secretary, W. C. Cameron, Continental and Commercial Bank building, Chicago, Ill.

Sept. 11-13.—AMERICAN ASSOCIATION OF PARK SUPERINTENDENTS. Annual convention, St. Louis, Mo. Secretary, Roland W. Cotterill, 533 City Hall, Seattle, Wash.

Sept. 11-14.—INTERNATIONAL ASSOCIATION OF MUNICIPAL ELECTRICIANS. Annual convention, Niagara Falls, N. Y. Secretary, Clarence R. George, Houston, Tex.

Sept. 11-14.—NEW ENGLAND WATERWORKS ASSOCIATION. Annual convention, Hartford, Conn. Secretary, Willard Kent, 715 Tremont Temple, Boston, Mass.

Sept. 18-20.—LEAGUE OF IOWA MUNICIPALITIES. Annual convention, Iowa City. Secretary, Frank G. Pierce, Marshalltown, Ia.

Sept. 18-20.—LEAGUE OF VIRGINIA MUNICIPALITIES. Annual convention, Lynchburg, Va. Secretary, L. C. Brinson, Portsmouth, Va.

Sept. 24-29.—LEAGUE OF CALIFORNIA MUNICIPALITIES. Annual convention, Santa Rosa, Cal. Secretary, Wm. J. Locke, Pacific Building, San Francisco, Cal.

Sept. 24-29.—THIRD NATIONAL EXPOSITION OF CHEMICAL INDUSTRIES. Exposition, Grand Central Palace, New York City.

Sept. 25-27.—SMOKE PREVENTION ASSOCIATION. Annual convention, Columbus, O. Secretary, Frank A. Chambers, City Hall, Chicago, Ill.

Sept. 27-29.—AMERICAN AND CANADIAN ENGINEERS AND ARCHITECTS OF NORWEGIAN BIRTH OR DESCENT. Informal congress and re-union, Chicago Norske Klub, Chicago, Ill. Chairman, Committee on Arrangements, Joachim G. Glaver, consulting engineer, Chicago, Ill.

Oct. 9-12.—LEAGUE OF KANSAS MUNICIPALITIES. Annual convention, Wichita, Kan. Secretary, C. H. Talbot, University of Kansas, Lawrence, Kan.

Oct. 15-17.—NATIONAL HOUSING ASSOCIATION. Annual conference, Hotel La Salle, Chicago, Ill. Secretary, Lawrence Veiller, 105 East 22d St., New York City.

Oct. 17-18.—LEAGUE OF MINNESOTA MUNICIPALITIES. Fifth annual convention, St. Cloud, Minn. Secretary-treasurer, Richard R. Price, University of Minnesota, Minneapolis.

Oct. 22-24.—AMERICAN CIVIC ASSOCIATION. Annual meeting, St. Louis, Mo. Secretary, Richard B. Watrous, 914 Union Trust building, Washington, D. C.

Nov. 19-24.—CITY MANAGERS' ASSOCIATION. Annual meeting, Detroit, Mich. Secretary, W. L. Miller, City Manager, St. Augustine, Fla.

Nov. 20-23.—PLAYGROUND AND RECREATION ASSOCIATION OF AMERICA.

Recreation Congress, Milwaukee, Wis. Secretary, H. S. Braucher, 1 Madison Ave., New York, N. Y.

Nov. 21-24.—NATIONAL MUNICIPAL LEAGUE. Twenty-third annual meeting, Hotel Statler, Detroit, Mich. Secretary, Clinton Rogers Woodruff, 703 North American Bldg., Philadelphia, Pa.

American Chemical Society.

Chemical engineers and manufacturers from all over the United States will gather in Boston on September 10, 11, 12, to participate in the fifty-fifth annual convention of the American Chemical Society. It is estimated that over a thousand will be present for the event, in spite of the fact that many will be compelled to remain at home on account of war orders and the development of war time plans and experiments. It was intended that the convention would occupy the entire second week of September, but it has been determined on account of the serious times and the mobilization of militia during that month, that it will be the better plan to eliminate such features of the convention as the big banquet and other entertainments, excepting that a typical New England shore dinner will be given and a smoker will give the desirable touch of good-fellowship to the event.

This convention will have an especially important significance in New England, as it will bring many chemical engineers and experts to this locality for the first time since the present great development of the chemical business in the United States, as a result of the cutting off of imports of chemicals and dyes from Germany and other foreign countries since the declaration of war in 1914. The rise of the chemical industry to its present important place in our manufacturing has placed the chemists themselves in the foreground of modern industrial activity, and the Government's recognition of their importance in modern warfare has brought about the mobilization of the chemical engineers and manufacturers throughout the entire country. There are about 30,000 engineers and chemists who have been so mobilized and in these days of such enormous problems as the use of a million pounds of explosives in one operation, the public is beginning to recognize the advance of the industry. The convention will undoubtedly bring to light some of the results of recent research and many experts and engineers who hold prominent positions in the advance of industry will be speakers at the various meetings.

National Safety Council.

In view of the changed conditions that are being brought about in numerous factories by the national draft, the matter of safety of employees, especially novices who are to take the places of those who enlist, has become a national problem of considerable importance, and with this idea foremost

in mind, a Safety and Sanitation Congress has been called to take place in New York City, September 10-15. It will be the largest congress of this nature ever held and delegates from all over the world will attend to discuss matters pertaining to the promotion and standardization of safety methods in factories, railroads, and the various industries in which hazardous occupations are found.

Coincident with the Congress there will be staged the Safety and Sanitation Exposition, three large floors of the Grand Central Palace being used for this. The National Safety Council and the American Museum of Safety will co-operate in this. Thousands of safety devices and demonstrations of accident prevention will be on view. The exposition will be open to the public for one week, and it is expected that it will result in at least a thousand new members being enrolled who will promise to conform to standards urged by the council.

Victory for the allies is more dependent on safety among our various industries than the average person imagines. Not only is this true of munition plants where many bad explosions have occurred, either through lack of pre-

(Continued on page 190)

PERSONALS

Adams, Robert W., manager of the Providence, R. I., office of the General Electric Co., has been elected president of the Providence Engineering Society.

Bartlett, H. H., is now office engineer with the engineers of Highland Park, Mich. He has been in charge of the sanitary experiment station of the University of Michigan and superintendent of maintenance of the Eastern Washtenau good roads district, Mich.

Beck, Edward A., has been appointed city manager of Goldsboro, N. C., at a salary of \$275 per month. The appointment takes effect Sept. 1.

Blinn, Ray S., has resigned as city manager of Westerville, O., and will enter the contracting business.

Compton, Maj. R. Keith, has resigned the chairmanship of the paving commission of Baltimore, Md., having been called into the Federal service. He will continue as member of the commission and as consulting engineer.

Magee, William A., Pennsylvania public service commissioner, has resigned to run for the Pittsburgh mayoralty.

Marston, A., dean of the College of Engineering at Ames, Ia., has been mustered into service as major of an engineering battalion.

Prior, J. H., formerly chief engineer of the Illinois Public Utilities Commission, has left the service of the commission to engage in practice as consulting engineer.

Skeggs, John H., has been placed in charge of Public Roads and Rural Engineering work in and around Tucson, Arizona.

NEW APPLIANCES

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations.

WINTHER MOTOR TRUCKS

For Hauling and for Fire Apparatus.

The principal features of the Winther motor truck are the constant mesh transmission, four bearing crankshaft, variable frame lengths, locking differentials, chassis lubrication and internal gear. The Winther truck is made in four models, 1½ to 2-ton capacity, 2½ to 3-ton, 3½ to 4-ton and 5 to 6. All types of body are made: Stake, dump or fire apparatus. A six-cylinder fire truck chassis and a four-wheel drive truck for standard gauge railway track are also made.

The following specifications for the 3½-4-ton model will serve to illustrate the general design and construction of the line. The motor is a Wisconsin, 4½x6, four-cylinder. The valves are tungsten steel, very large. The carburetor is Master. The gasoline feed is Stewart vacuum system. Ignition is by Eisemann high tension magneto. Lubrication is by force feed through hollow crank shaft. The radiator is of the cellular type, cast shell, spring suspended. The clutch is dry plate. The transmission is three-speed, constant mesh type. Steering gear, worm and nut, non-adjustable. Internal gear is mounted in unit with drop forged rectangular dead axle. The front axle is Timken I-beam with Timken bearings. The springs are chrome vanadium, semi-elliptic, 46x3 front and 56x4 rear. The wheels are cast steel, 36 front and 40 rear. The brakes are double external expanding on rear wheels. The frame is 7-inch ship channel, size depending on wheelbase. The speed is governed to 12 miles per hour.

Tires are 36x5 front, 40x5 dual or 40x10 single, rear.

In the dump truck a horizontal hydraulic hoist is used. The hydraulic cylinder is of short stroke and the power is so applied that the body is raised to the required dumping angle much more rapidly than when the lifting arms are attached to the front end of the body. In raising the body with this hoist the greatest strain on the truck frame comes over the rear springs and rear axle instead of midway on the truck frame, as with the vertical hoist. The cylinder is laid horizontally on the truck frame, underneath the body and protected by it, permitting the body to be so mounted that the forward end will just clear the back of the seat. Because of the better load distribution claimed for this type of construction, a shorter wheelbase and turning radius are possible. The body is no higher than the back of the seat on the truck. The body will hold, in the four models, 1½, 2½, 3½ and 5 cubic yards of asphalt respectively; 3, 4½, 6 and 9 cubic yards of garbage; 1½, 2¼, 3 and 5 cubic yards of gravel, sand or crushed stone.

The fire truck illustrated has a capacity of 1,500 feet of 2½-inch hose and is fully equipped with chemical tank, two three-gallon extinguishers, hose reel and basket, 200 feet of chemical hose, twenty and twelve-foot ladders, nozzle, poles, axes, lanterns, etc. The special six-cylinder fire truck has a 5¾x7 six-cylinder motor, Westinghouse electric lighting and starting out-

fit, Goodrich de Luxe tires and is equipped with a 350, 500, 750 or 1,000-gallon per minute pump. The equipment is made by Peter Pirsch, Kenosha.

The accompanying illustrations show a diagram of the dump truck and a photograph of the rear of a fire truck. The trucks are made by the Winther Motor Truck Co., Kenosha, Wis.

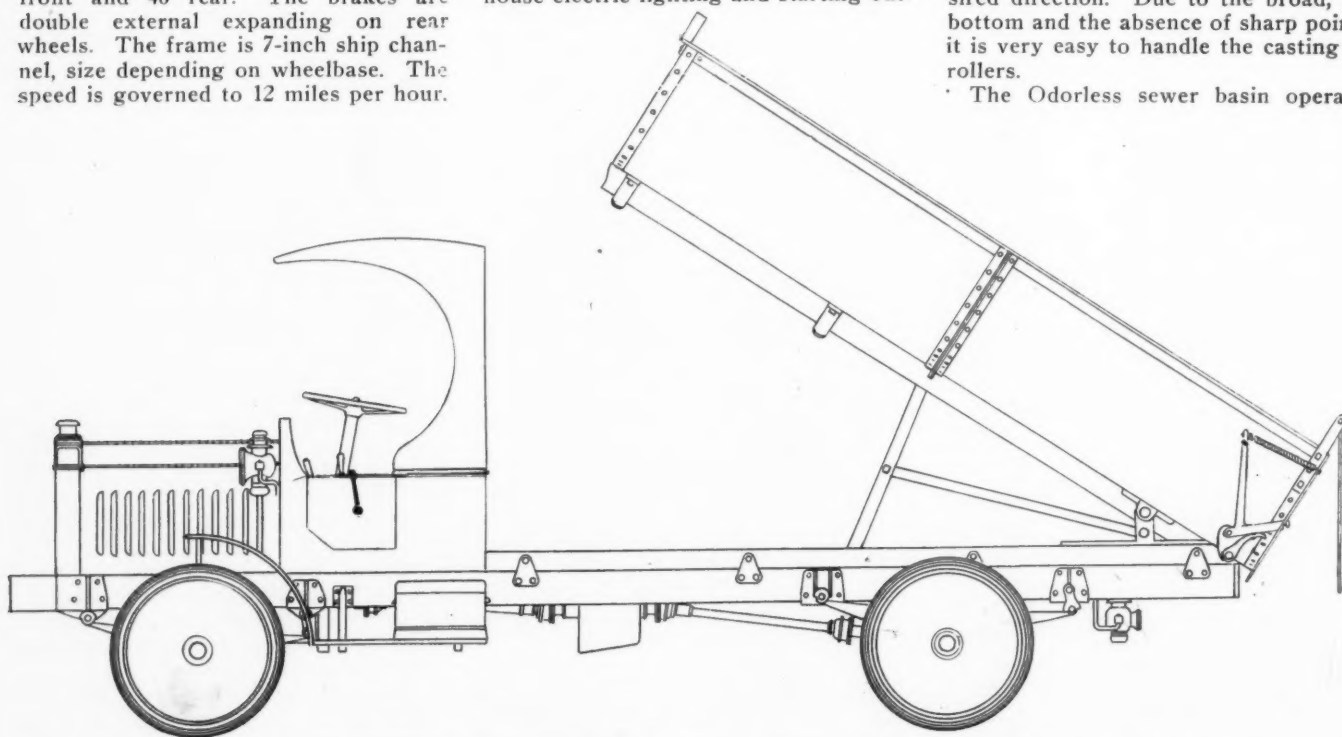
"ODORLESS" SEWER BASIN.

Of Novel Construction to Simplify Cleaning and Operation.

The Odorless sewer basin is claimed to eliminate the insanitary conditions which may frequently be traced to the ordinary sewer basin and to reduce the time, cost, labor and inconvenience in cleaning. It is found that one man, with a long handled shovel, can clean as many Odorless sewer basins in a day as two men can clean of the old style basins in five days. It is easily installed by any laborer and it is possible to move it just as easily when alterations to grade or width of street are necessary.

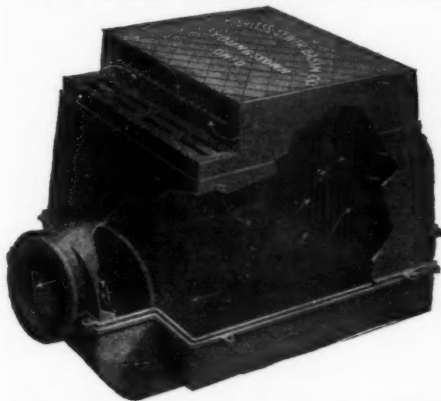
This basin is constructed of pure cast iron throughout. There is no machine work done on it. It is solid, strong and durable. The upper part, including the street grating, is a separate casting, secured by lugs and bolts, so that any special design can be furnished to meet city requirements. This also allows the top to be turned, so that the sewer connection can be made to run in any desired direction. Due to the broad, flat bottom and the absence of sharp points, it is very easy to handle the casting on rollers.

The Odorless sewer basin operates



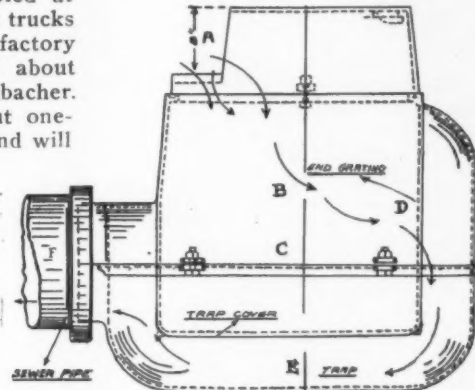
WINTHER DUMP TRUCK WITH HORIZONTAL HYDRAULIC HOIST.

as follows: Water and rubbish enter through the street opening A and pass into basin B. The solid matter settles to trap cover C, while the liquid passes through the end grating (or filter) D, and then by way of the trap E into the sewer F. Water in the trap prevents the egress of odors, gases and germ material, the trap holding sufficient water to last through the longest dry spell. Solid matter lying on the trap cover rapidly dries out so that it can



The Duplex Truck Company, Lansing, Mich., through H. M. Lee, president and general manager, announces the appointment of Andrew Langenbacher as sales manager of the corporation. Mr. Langenbacher was formerly in charge of exports, as well as a sales division of the Reo Motor Car Company, and has a wide acquaintance with automobile distributors. Mr. Langenbacher says because of the fact that production of Duplex trucks is to be increased the dealer organization of the company is to be doubled at once. "The value of the Duplex trucks to be manufactured in our new factory buildings next year will total about \$12,000,000," said Mr. Langenbacher. "We now have dealers in about one-half of the states in the Union and will

THE "ODORLESS"
SEWER
BASIN.



be collected in a dry or semi-dry condition. While the trap is continually flushed out by wash from the street, it is a simple operation to raise the trap cover and clean the trap. Since the walls of the basin do not crumble or deteriorate or allow seepage, troubles sometimes occurring in other types of construction are eliminated. Freezing difficulties are also claimed to be stopped.

This sewer basin is in wide use, among the cities having its service being Youngstown, E. Youngstown, Columbus, Canton and Fostoria, O., Altoona and Sharon, Pa. Toledo has recently made new installations.

The accompanying illustrations show a diagrammatic perspective and a section of the basin. It is made by the Odorless Sewer Basin Company, 15 Wick avenue, Youngstown, O.

allot the remaining territory to new dealers so that our dealer organization will spread completely over the United States by the first part of the new year."

U. S. Contracts for More Trucks.—In addition to the \$23,000,000 worth of motor trucks recently ordered for the War Department, orders have been placed for 5,750 vehicles at an aggregate cost of \$21,000,000, making about \$44,000,000 worth of army motor trucks

now under contract. The quartermaster's depot in Chicago has also been advised to buy 192 light trucks of large chassis and Babcock delivery bodies for the army cantonments, 12 to be issued to each place, the cost being \$750 each.

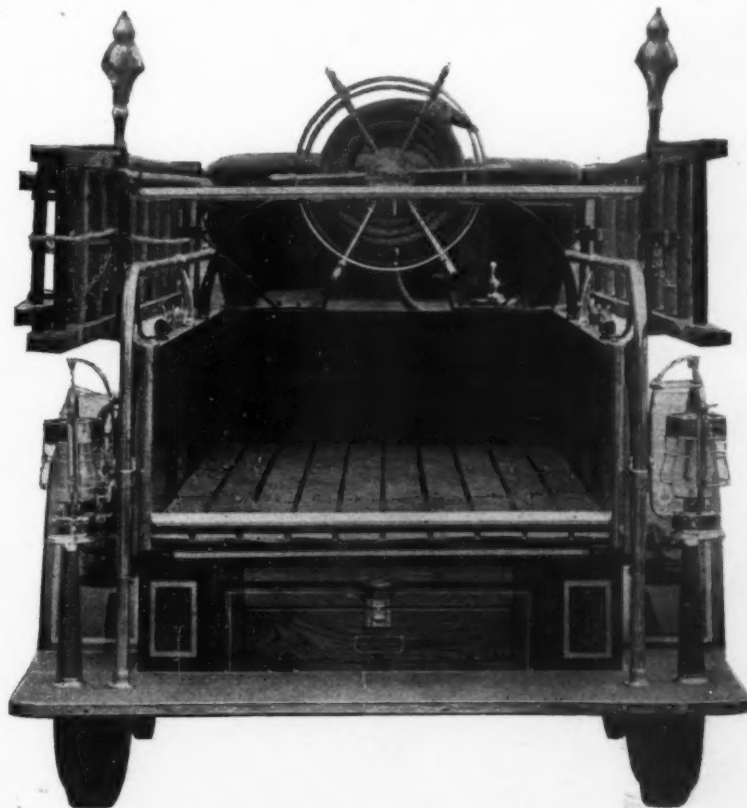
The Packard Motor Car Co., Detroit, received a contract for 3,000 trucks of 3-tons capacity, of which 1,200 will cost \$3,197.39 each, and 1,800 will cost \$3,836.87 each. The Locomobile Co. of America, Bridgeport, Conn., received a

contract for 1,250 trucks at \$4,071.38 each and the Pierce-Arrow Motor Car Co., Buffalo, 1,500 trucks at \$3,500 each, all of 1½ tons capacity.

Walter A. Zelnicker Supply Co., St. Louis, Mo., has just issued its "Blue Streak Special" bulletin, No. 222. This announcement lists some of the company's best machinery offerings, including locomotive cranes, concrete mixers, air compressors, boilers, hoists, steel piling, generators, motors, pumps and

INDUSTRIAL NEWS

Cast Iron Pipe.—Prices continue at the record high levels of last week. Municipal business is appearing in a few scattered jobs. The government is urging deliveries on the pipe contracted for for use in France and in the army cantonments. "The 400-ton lot recently asked for by Whitefish Bay, Wis., went to the American Cast Iron Pipe Co. At the recent Akron, Ohio, letting 1,340 tons went to the Hardware & Supply Co., bidding for the National Cast Iron Pipe Co., and 1,240 tons to the United States Cast Iron Pipe & Foundry Co. The government, among other orders placed in the East, gave one to the United States Cast Iron Pipe & Foundry Co. for 600 tons for delivery at Rockford, Ill. Quotations: Chicago—4-inch, class B and heavier, \$68.50; 6-inch, \$65.50. New York—4-inch, class B and heavier, \$68.50; 6-inch, \$65.50. Birmingham—4-inch, class B and heavier, \$63; 6-inch, \$60; class A, \$1 extra.



PIRSCH-WINTNER FIRE APPARATUS.

pipe. The bulletin should be of immediate interest to all contractors and others who need equipment in a hurry. EXPERTS

The Rochester Excavating Machinery Co., Inc., has moved its Rochester office to its new factory at Caledonia, N. Y.

The Ingersoll-Rand Co., 11 Broadway, New York, N. Y., announces the election of J. H. Jowett, formerly general sales manager, to be vice-president of the company. His place will be taken by J. D. Albin, former assistant general sales manager.

NEWS OF THE SOCIETIES

(Continued from page 187)

caution or carelessness, but also in the less hazardous industries.

The interesting series of exhibits will be that showing how the lives of our soldiers and sailors are being guarded as efficiently as possible under the extraordinary conditions the present war has developed. Demonstrations of the weird-looking gas mask for contending against suffocating and lachrymose gases, the various types of camouflage, or methods of painting scenery and arranging foliage so as to hide batteries and transports to deceive the enemy, and the modern sanitary ideas in vogue at the war hospitals, should form a tremendously interesting exhibition. Several dozen reels of motion picture film showing the operation of safety devices and the dangers of neglecting these precautions are to be shown daily. It is believed that this exposition will have an excellent effect upon the thousands of factory employees who will have an opportunity to see it.

Pennsylvania League of Third Class Cities.

The program for the convention of the League of Third Class Cities to be held in Harrisburg August 28, 29 and 30 has been announced. It is as follows:

Tuesday, August 28.

Morning session, 10 o'clock—Reception and registration of delegates; prayer, the Rev. Ellis N. Kramer; address of welcome, John E. Fox, city solicitor of Harrisburg; response, Ira W. Stratton, vice-president of the league; roll call of delegates; reports of the secretary of the league, treasurer of league and executive committee.

Afternoon session, 2 o'clock—Address by Dr. Samuel G. Dixon, state health commissioner; address, "Method of Street Paving and Assessments," M. B. Cowden, city engineer, Harrisburg; address, "What One City of the Third Class in Pennsylvania Has Accomplished Under the Commission Form of Government," R. Nelson Bennett, superintendent of accounts and finance, Wilkes-Barre.

At 4.30 o'clock, review of Harrisburg's volunteer fire department, Market square.

Evening, 8.30 o'clock—Reception and smoker in honor of the delegates at the Harrisburg Club, by members of Harrisburg city council.

Wednesday, August 29.

Morning session, 9.30 o'clock—Address, T. C. Hare, city solicitor of Altoona; address, "Workmen's Compensation Law," Harry A. Mackey, chairman of the Workmen's Compensation Board; report of law committee, James A. Gardner, city solicitor of New Castle, Pa.; open discussion.

Afternoon session, at 2 o'clock—Address, "Relation of Public Utilities to Third Class Cities," William B. Ainey, chairman of the Public Service Commission; address, "Civil Service Administration in Cities of the Third Class," Cyrus D. Foss, counsel and secretary of the Civil Service Reform Association of Pennsylvania; address, "Weights and Measures," James

Sweeney, chief of the State Bureau of Standards; lecture, "Awakening of Harrisburg," J. Horace McFarland, secretary of the Harrisburg Municipal League.

Evening—Banquet at the Palm Room, Elks Club, 216 North Second street.

Thursday, August 30.

Morning session, 9.30 o'clock—Address, "City Planning," by member of the Harrisburg Planning Commission; address, "Food Inspection," Dr. J. M. J. Raunick, Jr., Harrisburg health officer; open discussion; unfinished business, new business, fixing place of meeting, election of officers, adjournment.

Afternoon, 2 o'clock—Delegates are requested to report promptly at the hour above mentioned for an automobile trip over the park system, after which the Romper Day exercises will be witnessed at Reservoir Park.

PROBLEMS CITIES ARE STUDYING WITH EXPERTS

Sanitary SEWERS are being constructed by Sloan, N. Y., plans having been completed by the engineer, Geo. C. Diehl, 575 Ellicott square, Buffalo, N. Y.

SEWERS constructed by Avalon, N. J., were planned by Ralph R. Goff, Ocean City, N. J.

A SEWAGE DISPOSAL PLANT is being constructed by Brentwood, Pa. Plans and specifications were the work of Douglass & McKnight, Union Bank building, Pittsburgh, Pa.

A SEWER constructed by Bedford, O., was planned by C. W. Courtney, 509 Leader-News building, Cleveland, Ohio.

In making STREET IMPROVEMENTS, Lodi, O., had the engineering services of R. G. Scantlebury, Ashland, Ohio.

A sanitary SEWER to be constructed by Villisca, Ia., was planned by Theodore S. DeLay, Lichty building, Creston, Ia.

In making PAVING IMPROVEMENTS, Clinton, Okla., has the consulting engineering services of the Benham Engineering Co., 1300 Colcord building, Oklahoma City, Okla.

A CONCRETE BRIDGE is to be constructed by Lindsay, Ont. The plans and specifications for the structure were prepared by Bowman & Connor, 31 Queen street, W., Ontario.

Jackson, Mich., is installing new MACHINERY in its WATERWORKS. The consulting engineer on the improvement is Seabury G. Pollard, 3422 Burch avenue, Cincinnati, O.

The Red River bridge district, Miller County, Texarkana, Ark., is to build a concrete HIGHWAY BRIDGE to cost \$250,000. The engineers are Harrington, Howard & Ash, Orear-Leslie building, Kansas City, Mo.

Judith Gap, Mont., is making a number of STREET IMPROVEMENTS. The engineers for the work are Gerharz-Jaqueth Engineering Co., 514 First National Bank building, Great Falls, Mont.

Stanley, N. D., is extending its SEWER SYSTEM. The engineer for the improvement is T. R. Atkinson, Bismarck, N. D.

In constructing SEWERS, Exeter, Pa., has the engineer services of Harry Myers, P. O. building, Pittston, Pa.

Ponca, Neb., is to construct SANITARY SEWERS. Plans are in process of preparation by the engineer, C. Monarty, 500 United Bank building, Sioux City, Ia.

Huntsville and Kahoka, Mo., have been considering the improvement of their WATERWORKS and SEWER SYSTEMS. The cities have had the expert advice of E. T. Archer & Co., 609 New England building, Kansas City, Mo.

Farmville, Va., is making a number of STREET IMPROVEMENTS. The engineer for the work is W. M. Piatt, Durham, N. C.

Franklin County, Columbus, O., is to construct a reinforced CONCRETE BRIDGE. The consulting engineers for the work are Braun, Fleming & Knollman, Columbus, O.

The village of Altamont, N. Y., is to construct SEWERS and a DISPOSAL PLANT. The engineer preparing plans and specifications for the work is W. W. Chadsey, 20 Swan street, Schenectady, N. Y.

The Chicago, Ill., Sanitary District, in its work on the SEWERAGE and DRAINAGE SYSTEMS of the district has appointed as consulting engineer A. Baldwin Wood, of the Sewerage and Water Board, New Orleans, La.